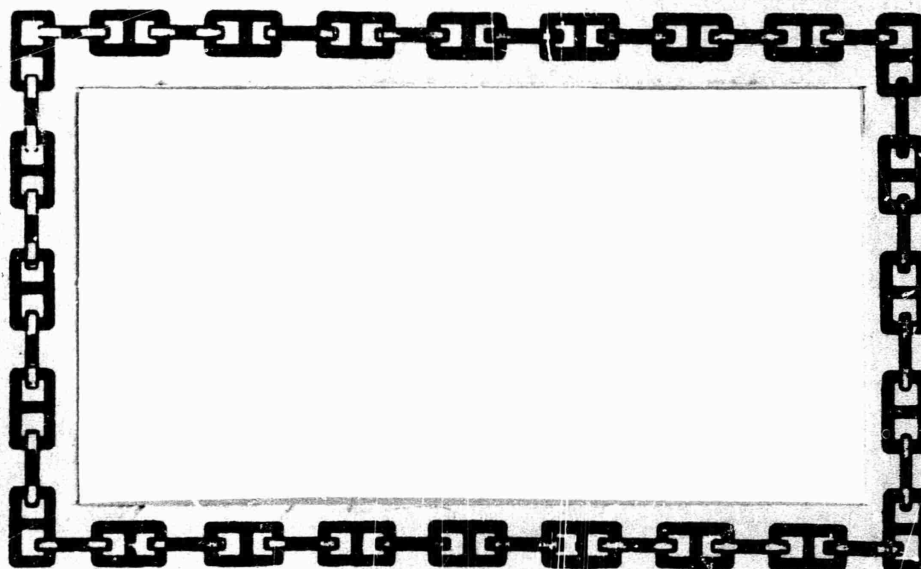
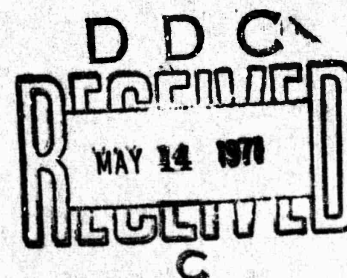
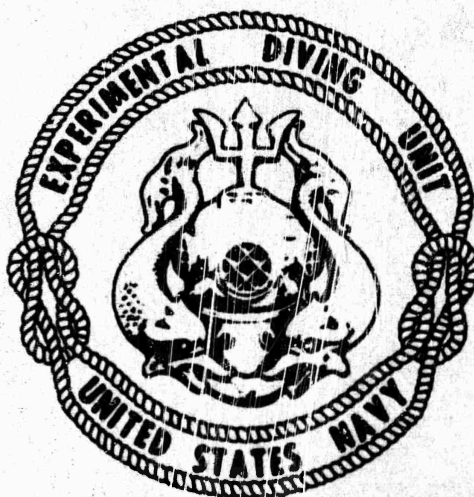


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RESEARCH REPORT 15-70

REPORT OF EXPERIMENTAL DIVES
FOR SEALAB III SURFACE SUPPORT
DECOMPRESSION SCHEDULES

1 December 1970

by

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ABSTRACT

This report describes the decompression schedules that were developed and tested by the U.S. Navy Experimental Diving Unit (NAVXDIVINGU) in preparation for SEALAB III. The need was foreseen for a surface supported diving capability for underwater tasks of relatively short duration which would not necessitate the use of saturation diving with its resulting long decompression times. The decompression schedules described in this report were designed to provide that capability.

Decompression schedules were developed for dives of 300, 350, 400 and 450 feet with bottom times of 15, 30, and 60 minutes at each depth. A schedule for a 500-foot dive with a bottom time of 30 minutes was also developed. These developmental schedules were tested in a series of 54 experimental dives in the NAVXDIVINGU facility during the period April 1965 through July 1967. Certain schedules were modified and retested as a result of experience gained in the initial testing effort.

This report presents each developmental decompression schedule and summarizes the experimental dives that were made to evaluate them. Problems encountered, particularly problems of decompression sickness, are also summarized. The final decompression schedules which emerged from the experimental dives and evaluation of their results are presented in detail.

The final schedules are published for information of all interested activities and individuals. At the time of publication of this report, these schedules had not been evaluated in the open sea and have not been promulgated by the Navy for routine diving operations.

ACKNOWLEDGEMENT

The experimental dives described in this Report were developed and tested at the Navy Experimental Diving Unit (EDU) under the direction of Captain R. D. Workman, MC, USN and Commander, R. C. Bornman, MC, USN, during the period April 1965 through July 1967. The authors have extracted the available data from EDU Diving Logs in an effort to make the information available to the general diving community.

CONTENTS

	<u>Page</u>
ABSTRACT	ii
ACKNOWLEDGEMENT	iii
CONTENTS	iv
Section 1 INTRODUCTION	1
1.1 Purpose	1
1.2 Background	1
1.3 Scope	1
Section 2 METHODS AND DIVE PROCEDURES	2
2.1 Diving Facilities	2
2.2 Breathing Equipment	3
2.3 General Dive Procedures	3
2.4 Criteria for a Successful Schedule	4
2.5 Summary of Dive Groups	4
Section 3 DIVE RESULTS	5
3.1 300-Foot/15-Minute Dives	6
3.2 300-Foot/30-Minute Dives	8
3.3 300-Foot/60-Minute Dives	13
3.4 350-Foot/15-Minute Dives	16
3.5 350-Foot/30-Minute Dives	18
3.6 350-Foot/60-Minute Dives	22
3.7 400-Foot/15-Minute Dives	29
3.8 400-Foot/30-Minute Dives	34
3.9 400-Foot/60-Minute Dives	38
3.10 450-Foot/15-Minute Dives	48
3.11 450-Foot/30-Minute Dives	51
3.12 450-Foot/60-Minute Dives	56
3.13 500-Foot/30-Minute Dives	61

	<u>Page</u>
Section 4 DISCUSSION OF DIVE RESULTS	65
4.1 Decompression Experience	66
4.2 Actual vs Test Conditions	66
4.3 Status of Final Decompression Schedules.	67
Appendix A FINAL DECOMPRESSION SCHEDULES	68
Appendix B DIVER DATA	105
Appendix C SUMMARY OF DECOMPRESSION SICKNESS	108

TABLES

Table No.

1	Initial Schedule - 300-Foot/15-minute.	6
2	Initial Schedule Summary - 300-Foot/15-Minute . . .	7
3	Initial Schedule - 300-Foot/30-Minute	8
4	Initial Schedule Summary - 300-Foot/30-Minute. . .	9
5	Modification A Schedule Summary - 300-Foot/30- Minute	10
6	Modification B Schedule Summary - 300-Foot/30- Minute	11
7	Schedule Comparisons - 300-Foot/30-Minute. . . .	12
8	Initial Schedule - 300-Foot/60 Minute.	13
9	Initial Schedule Summary - 300-Foot/60 Minute. .	14
10	Modification A Schedule Summary - 300-Foot/60- Minute	15
11	Initial Schedule-350-Foot/15-Minute.	16
12	Initial Schedule Summary - 350-Foot/15-Minute. .	17
13	Initial Schedule - 350-Foot/30-Minute.	18
14	Initial Schedule Summary - 350-Foot/30-Minute. .	20
15	Initial Schedule - 350-Foot/60-Minute	22
16	Initial Schedule Summary - 350-Foot/60-Minute. .	23
17	Modification A Schedule Summary - 350-Foot/60- Minute	25
18	Modification B Schedule Summary - 350-Foot/60- Minute	25
19	Modification Schedule Comparisons - 350-Foot/60- Minute	26
20	Initial Schedule-400-Foot/15-Minute	29

<u>Table No.</u>		<u>Page</u>
21	Initial Schedule Summary - 400-Foot/15 Minute . . .	30
22	Modification A Schedule Summary - 400-Foot/15-Minute	31
23	Schedule Comparisons - 400-Foot/15-Minute	32
24	Initial Schedule - 400-Foot/30-Minute	34
25	Initial Schedule Summary - 400-Foot/30-Minute . . .	37
26	Initial Schedule - 400-Foot/60-Minute	38
27	Initial Schedule Summary - 400-Foot/60-Minute . . .	41
28	Modification A Schedule Summary - 400-Foot/60-Minute	43
29	Modification B Schedule Summary - 400-Foot/60-Minute	43
30	Schedule Comparisons - 400-Foot/60-Minute	44
31	Initial Schedule - 450-Foot/15-Minute	48
32	Initial Schedule Summary - 450-Foot/15-Minute . . .	50
33	Initial Schedule - 450-Foot/30-Minute	51
34	Initial Schedule Summary - 450-Foot/30-Minute . . .	54
35	Modification A Schedule Summary - 450-Foot/30-Minute	55
36	Initial Schedule - 450-Foot/60-Minute	56
37	Initial Schedule Summary - 450-Foot/60-Minute . . .	60
38	Initial Schedule - 500-Foot/30-Minute	61
39	Initial Schedule Summary - 500-Foot/30-Minute . . .	64
40	Summary of Dive Groups	65
A-1	Final Schedule 300-Foot/15-Minute	70
A-2	Final Schedule 300-Foot/30-Minute	71
A-3	Final Schedule 300-Foot/60-Minute	72
A-4	Final Schedule 350-Foot/15-Minute	75
A-5	Final Schedule 350-Foot/30-Minute	76
A-6	Final Schedule 350-Foot/60-Minute	79
A-7	Final Schedule 400-Foot/15-Minute	83
A-8	Final Schedule 400-Foot/30-Minute	85
A-9	Final Schedule 400-Foot/60-Minute	88
A-10	Final Schedule 450-Foot/15-Minute	91
A-11	Final Schedule 450-Foot/30-Minute	93
A-12	Final Schedule 450-Foot/60-Minute	97
A-13	Final Schedule 500-Foot/30-Minute	102
B-1	Diver Data	106
C-1	Decompression Sickness by Dive Group	109
C-2	Decompression Sickness by Diver	111

FIGURES

<u>Figure No.</u>		
1	NAVXDIVINGU Chamber Facility	2
	vi	RR 15-70

Section 1

INTRODUCTION

1.1 PURPOSE

This report presents the results of a series of chamber dives conducted at the U.S. Navy Experimental Diving Unit (NAVXDIVINGU) during 1965, 1966, and 1967 in preparation for SEALAB III. The primary purpose of these dives was to develop and test a set of decompression schedules for short, non-saturation dives, between the surface and the sea floor habitat. Schedules were modified and retested when symptoms of decompression sickness occurred with the objective of developing a safe final schedule for each dive group.

1.2 BACKGROUND

Although the SEALAB III experiment was focused primarily on the use of an underwater habitat it was foreseen that there would also be a requirement for numerous short dives from the surface to the depth of the habitat.

NAVXDIVINGU undertook the project of developing the required decompression schedules, accomplishing the work with its own divers and diving facilities. A few dives were conducted in April, 1965. Work continued intermittently on the project throughout 1966 and was completed in the summer of 1967. The project was accomplished concurrently with other experimental programs during this period.

1.3 SCOPE

Section 2 of this report describes the methods and dive procedures that were used in the developmental program. Section 3 presents the dive results. Dives are grouped according to depth and bottom time. For each dive group, detailed decompression schedules are tabulated and the results of each dive are summarized. Variations from schedules and incidents of decompression sickness are also summarized. The evolution of the developmental decompression schedule is shown. Section 4 discusses results of the program and presents an overall summary of the dives that were conducted.

The final decompression schedules for the 13 dive groups involved in the program are presented in Appendix A. Appendix B provides data on the divers and Appendix C recapitulates the incidents of confirmed and possible decompression sickness by each dive group and each diver.

Section 2

METHODS AND DIVE PROCEDURES

2.1 DIVING FACILITIES

The experimental dives described in this report were conducted under controlled conditions in a diving chamber with a wetpot at NAVXDIVINGU. The water temperature for the experimental dives ranged from a low of 68°F. to a high of 90°F. The average temperature was about 80°F. Figure 1 is a diagram of the diving chamber.

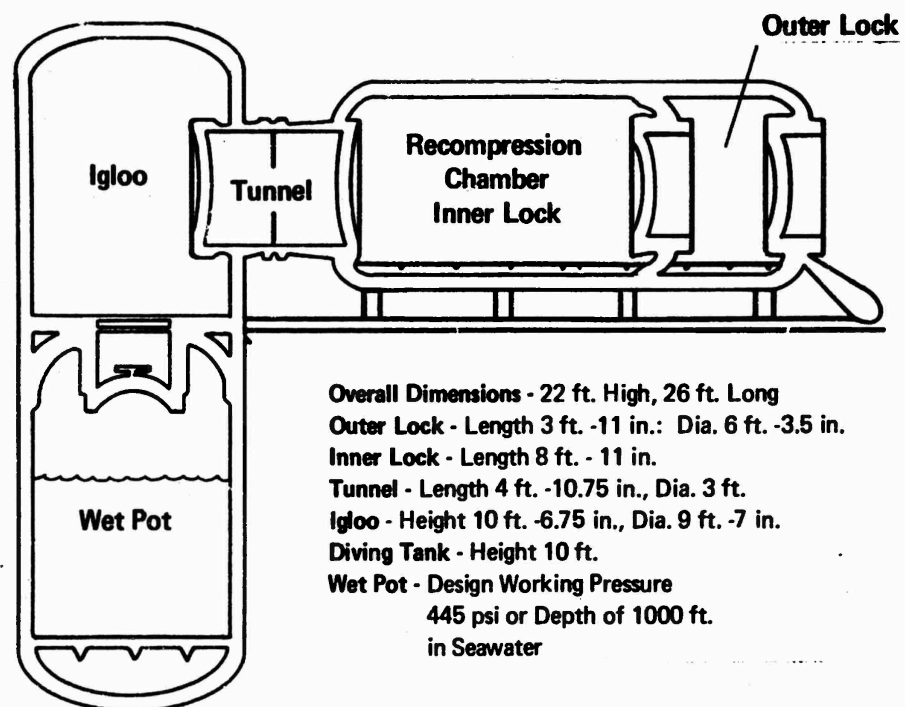


Figure 1. NAVXDIVINGU Chamber Facility

2.2 BREATHING EQUIPMENT

The majority of dives conducted in this program were two-man dives. The breathing equipment used for these dives was the modified semi-closed circuit MK VI back pack, surfaced supplied through a Garrahan flow control block.

A few dives had three subjects. The MK VI equipment was used by two of the divers on these three-man dives. The third diver used a MK VIII semi-closed circuit breathing apparatus.

2.3 GENERAL DIVE PROCEDURES

The divers breathed air in the chamber until reaching a specified depth, usually 100 feet. At that point they switched to the HeO₂ mixture supplied by the breathing apparatus, dropped into the wetpot, and were compressed to the bottom pressure.

At depth the subjects followed an alternating work pattern which included lifting weights, swimming against a trapeze (equivalent to 0.8 knots) and other work routines. Upon completion of the prescribed bottom time, the divers re-entered the igloo to begin decompression. On most dives, a shift to a second HeO₂ mixture was made, normally upon or shortly after leaving the bottom depth.

In the early phase of decompression, since the igloo and recompression chamber contained an air atmosphere, the divers had to remain on the breathing apparatus or on a mask as long as a HeO₂ mixture was required. A shift to chamber air was normally made at 100 feet on ascent, divers removing the HeO₂ mask/apparatus and breathing chamber air at the prescribed time. During the remainder of the decompression divers alternated breathing chamber air and 100% oxygen (by mask), normally finishing the dive on the latter medium.

Rates of travel varied throughout the dive groups. Generally, about five minutes was scheduled for the descent, including time for shifting from chamber air to the HeO₂ breathing mixture. Most of the minor deviations from the schedules occurred during descent because of changes from the scheduled rates of travel. Rates of travel during ascent were normally adhered to closely once the schedule entered into its prescribed decompression stops. The last 10 seconds of each decompression stop were generally used to travel to the next shallower stop.

2.4 CRITERIA FOR A SUCCESSFUL SCHEDULE

Circumstances permitted only a small number of dives in most of the groups to be tested. Generally, if two dives (normally four man dives) produced no decompression sickness in a given dive group, testing shifted to another group. In instances where decompression sickness was encountered, additional dives were made whenever possible using modified schedules until a bends-free dive was made.

The most successful schedule to emerge for a given dive group from the above process was selected as the final schedule for that dive group. These final decompression schedules are presented in Appendix A along with information on the number of bends-free dives and the number of cases of decompression sickness experienced with each schedule.

2.5 SUMMARY OF DIVE GROUPS

Dives that have been included in this report were conducted at depths ranging from 300 feet to 500 feet and with bottom times ranging from 15 minutes to 60 minutes.

The dives are analyzed and presented in the following groups:

DIVE GROUP

Depth (Feet - Sea Water)	Bottom Time* (Minutes)
300	15
300	30
300	60
350	15
350	30
350	60
400	15
400	30
400	60
450	15
450	30
450	60
500	30

* Bottom time includes descent time.

Section 3

RESULTS

The results of the dives that were conducted in each of the 13 groups are presented in this section.

For each group, the initial decompression schedule tested is presented first, followed by a summary of the dives conducted in accordance with that schedule. Problems encountered during and after the dives are then described. Modifications to the initial schedule, if any, are addressed and summaries of dives conducted under modified schedules are also presented. Where appropriate, the various schedules used for one dive group are presented in tabular form for purposes of easy comparison.

The most successful decompression schedule in each dive group is selected as the final decompression schedule for that group and is presented in Appendix A.

3.1 300-FOOT/15-MINUTE DIVES

3.1.1 Initial Decompression Schedule

The initial decompression schedule for this dive group is presented in Table 1 and the summary of the dives conducted using this schedule is presented in Table 2.

Table 1
INITIAL SCHEDULE 300-FOOT/15-MINUTE

Depth(ft)	Time(min)	Elapsed Time (hr:min:sec)	Media
0-100	1	00:00:00 - 00:01:00	Air
100	0.5	00:01:00 - 00:01:30	HeO ₂
100-300	2	00:01:30 - 00:03:30	80/20
300	11.5	00:03:30 - 00:15:00	↓
300-120	3	00:15:00 - 00:18:00	Air
120	1	00:18:00 - 00:19:00	↓
110	2	00:19:00 - 00:21:00	Air
100	2	00:21:00 - 00:23:00	↓
90	2	00:23:00 - 00:25:00	Air
80	5	00:25:00 - 00:30:00	↓
70	5	00:30:00 - 00:35:00	Air
60	5	00:35:00 - 00:40:00	↓
50	5	00:40:00 - 00:45:00	Air
40	15	00:45:00 - 01:00:00	O ₂
30	15	01:00:00 - 01:15:00	Air
20	25	01:15:00 - 01:40:00	O ₂
10	25	01:40:00 - 02:05:00	Air
10-0	10	02:05:00 - 02:15:00	O ₂

Times at the decompression stops include the time required for travel to next stop.

3.1.2 Problems/Modifications

All eight dives in this group were made under the initial schedule. No decompression sickness or other problems were encountered. No adjustments to the initial schedule were made.

Dives 1, 2 and 8 varied from schedule on descent in that the descent from 100 feet was made at an average rate of 60 FPM vice the prescribed rate of 100 FPM. This increased the descent time to about five minutes for these dives. Otherwise, all dives adhered closely to schedule with no significant variations.

Table 2

INITIAL SCHEDULE SUMMARY 300-FOOT/15-MINUTE

Dive No.	Date	Subject	Principal Breathing Mixture	Surface Injection Rate	Time to Bottom	Total Time of Dive	Decompression Sickness
				liters/min	hr:min:sec	hr:min:sec	
1	31 May 67	Mulally Douthit	HeO ₂ 80%/20%	36.0 34.0	00:05:05	02:14:30	No
2	31 May 67	Meeks French	HeO ₂ 80%/20%	36.0 34.0	00:05:23	02:15:00	No
3	27 Jun 67	Pratt Cato	HeO ₂ 80%/20%	35.0 34.0	00:03:45	02:15:00	No
4	27 Jun 67	Jones Mulally	HeO ₂ 80%/20%	33.8 33.8	00:03:30	02:15:00	No
5	28 Jun 67	Duff Brauner	HeO ₂ 80%/20%	34.6 33.5	00:03:27	02:15:00	No
6	3 Jul 67	Kerr Beckham	HeO ₂ 80%/20%	34.4 33.6	00:03:25	02:15:30	No
7	5 Jul 67	Brady Villasenor	HeO ₂ 80%/20%	33.0 34.0	00:03:00	02:15:25	No
8	5 Jul 67	Langod Green	HeO ₂ 80%/20%	34.0 33.5	00:05:20	02:15:00	No

The initial schedule appears unmodified as the final schedule for this dive group as Table A-1 in Appendix A.

3.2 300-FOOT/30-MINUTE

3.2.1 Initial Decompression Schedule

The initial decompression schedule for this group is presented in Table 3 and the summary of the dives using this schedule is presented in Table 4.

Table 3

INITIAL SCHEDULE 300-FOOT/30-MINUTE

Depth(ft)	Time(min)	Elapsed Time (hr:min:sec)	Media
0-75	1	00:00:00 - 00:01:00	Air
75	0.5	00:01:00 - 00:01:30	↓
75-300	3	00:01:30 - 00:04:30	HeO ₂
300	25.5	00:04:30 - 00:30:00	85/15
300-180	2	00:30:00 - 00:32:00	↓
180-150	1	00:32:00 - 00:33:00	↓
150	1	00:33:00 - 00:34:00	↓
140	2	00:34:00 - 00:36:00	↓
130	2	00:36:00 - 00:38:00	↓
120	5	00:38:00 - 00:43:00	Air
110	5	00:43:00 - 00:48:00	↓
100	5	00:48:00 - 00:53:00	↓
90	5	00:53:00 - 00:58:00	↓
80	5	00:58:00 - 01:03:00	↓
70	15	01:03:00 - 01:18:00	↓
60	15	01:18:00 - 01:33:00	↓
50	15	01:33:00 - 01:48:00	↓
40	30	01:48:00 - 02:18:00	O ₂
30	30	02:18:00 - 02:48:00	Air
20	30	02:48:00 - 03:18:00	O ₂
20	30	03:18:00 - 03:48:00	Air
10	30	03:48:00 - 04:18:00	O ₂
10	30	04:18:00 - 04:48:00	Air
10	20	04:48:00 - 05:08:00	O ₂
10-0	10	05:08:00 - 05:18:00	Air

Times at the decompression stops include the time required for travel to next stop.

Table 4

INITIAL SCHEDULE SUMMARY 300-FOOT/30-MINUTE

Dive No.	Date	Subject	Principal Breathing Mixture	Surface Injection Rate	Time to Bottom	Total Time of Dive	Decompression Sickness
				liters/min	hr:min:sec	hr:min:sec	
1	29 Jun 67	Kennedy Sundstrom	HeO ₂ 85%/15%	34.6 32.8	00:04:15	05:18:00	No
2	30 Jun 67	Mesplay Mulally	HeO ₂ 85%/15%	35.5 35.0	00:04:30	05:18:00	No
3	6 Jul 67	Mullen Mandible	HeO ₂ 85%/15%	32.5 33.4	00:04:25	07:47:45	Mullen

3.2.2 Problems/Modifications

The initial schedule was used for Dives 1, 2, and 3. Dives 1 and 2 adhered to schedule with no problems encountered. Dive 3 adhered to schedule to the 40-foot depth at elapsed time 01:48:00. Mullen reported pain in his right knee at 01:55:00, having first felt it just before leaving the 50-foot decompression stop. The pain was getting worse at 40 feet. He was recompressed to 100 feet, reporting total relief at 67 feet. Mandible accompanied the treatment. Both divers finished the dive on an extended schedule.

Modification A Schedule was tested during Dives 4 and 5. This schedule varied only slightly from the initial schedule.

A summary of the dives conducted under Modification A Schedule is presented in Table 5.

Both dives 4 and 5 were conducted as scheduled to the point of beginning the final ascent from 10 feet to the surface at elapsed time 05:22:00. The time of reaching surface in Dive 4 was recorded incorrectly; it is assumed to be 05:32:00 based on the schedule. The final ascent in Dive 5 was made in 30 seconds instead of the scheduled 10 minutes, accounting for the reduced total time of dive of 05:22:30.

Jones experienced decompression sickness beginning within 7 minutes after Dive 5. He was pale, weak and numb in both arms, and had pain in his right forearm. He was treated with recompression at 60 feet with apparent relief, the treatment period lasting almost 5 hours on Treatment Table VI. Nine hours later, a second period, four hours in duration, was necessary as a result of pain in his groin and both legs.

Table 5

MODIFICATION A SCHEDULE SUMMARY 300-FOOT/30-MINUTE

Dive No.	Date	Subject	Principal Breathing Mixture	Surface Injection Rate	Time to Bottom	Total Time of Dive	Decompression Sickness
				liters/min	hr:min:sec	hr:min:sec	
4	7 Jul 67	Wyatt Hendry	HeO ₂ 85%/15% 80%/20%	32.9 34.4	00:03:15	05:32:00	No
5	10 Jul 67	Jones Meeks	HeO ₂ 85%/15% 80%/20%	Not Recorded	00:04:00	05:22:30	Jones

As a result of the problems with the first two schedules, Modification B Schedule was developed (Table 7). This schedule significantly extended the total time of dive. The resulting total time of dive is 06:36:00 in Modification B Schedule as compared to 05:18:00 in the initial schedule and 05:32:00 in Modification A Schedule.

Dives 6 through 10 were conducted to test Modification B Schedule (Table 6). Descent was 1 minute slow on Dive 6 primarily because of a long hold at 75 feet. Divers also reached bottom late on Dive 9 because Hendry had ear trouble on descent. Except for these minor variations, Dives 6 through 10 adhered precisely to schedule. No problems were encountered.

The initial schedules and the modifications are compared in Table 7. Modification B Schedule appears as the final decompression schedule for this dive group as Table A-2 in Appendix A.

Table 6

MODIFICATION B SCHEDULE SUMMARY 300-FOOT/30-MINUTE

Dive No.	Date	Subject	Principal Breathing Mixture	Surface Injection Rate	Time to Bottom	Total Time of Dive	Decompression Sickness
				liters/min	hr:min:sec	hr:min:sec	
6	12 Jul 67	Cato Pratt	HeO ₂ 85%/15% 80%/20%	Not Recorded	00:05:30	06:36:00	No
7	13 Jul 67	Kennedy Sundstrom	HeO ₂ 85%/15% 80%/20%	Not Recorded	00:04:20	06:36:00	No
8	14 Jul 67	Wyatt Winters	HeO ₂ 85%/15% 80%/20%	36.2 38.0	00:04:00	06:36:00	No
9	17 Jul 67	Mulally Hendry	HeO ₂ 85%/15% 80%/20%	38.2 36.2	00:07:10	06:36:00	No
10	18 Jul 67	Meeks Houle	HeO ₂ 85%/15% 80%/20%	38.0 36.2	00:03:55	06:36:00	No

Table 7

SCHEDULE COMPARISONS 300-FOOT/30-MINUTE

Depth (ft)			Time (min)			Breathing Mixture		
Schedule			Schedule			Schedule		
Init.	Mod A	Mod B	Init.	Mod A	Mod B	Init.	Mod A	Mod B
0-75	0-100	0-75	1	1	1	Air	Air	Air
75	100	75	0.5	0.5	0.5	↓	↓	↓
75-300	100-300	75-300	3	2	3	HeO ₂	HeO ₂	HeO ₂
300	300	300	25.5	26.5	25.5	85/15	85/15	85/15
300-180	300-170	300-180	2	2.5	2.5	↓	HeO ₂	↓
180-150	170-150	180-150	1	0.5	0.5	↓	80/20	↓
	150		1	1	1	↓	↓	HeO ₂
	140		2	2	2	↓	↓	80/20
	130		2	4	5	↓	↓	↓
	120		5	4	5	Air	Air	↓
	110		5	4	5	↓	↓	Air
	100		5	5	5	↓	↓	↓
	90		5	6	5	↓	↓	↓
	80		5	12	15	↓	↓	↓
	70		15	12	15	↓	↓	↓
	60		15	14	15	↓	↓	↓
	50		15	15	20	↓	↓	↓
	40		30	35	30	O ₂	↓	O ₂
	30		30	25	30	Air	O ₂	Air
	30		- -	- -	30	- -	- -	O ₂
	20		30	30	30	O ₂	Air	Air
	20		30	20	30	Air	O ₂	O ₂
	10		30	30	30	O ₂	Air	Air
	10		30	20	30	Air	O ₂	O ₂
	10		20	30	30	O ₂	Air	Air
	10		- -	20	20	- -	O ₂	O ₂
	10-0		10	10	10	Air	O ₂	O ₂

TOTAL ELAPSED TIME:

Initial Schedule	05:18:00
Modification A	05:32:00
Modification B	06:36:00

3.3 300-FOOT/60-MINUTE DIVES

3.3.1 Initial Decompression Schedule

The initial decompression schedule for this dive group is presented in Table 8 and the summary of the dives conducted using this schedule is presented in Table 9.

Table 8
INITIAL SCHEDULE 300-FOOT/60-MINUTE

Depth(ft)	Time(min)	Elapsed Time (hr:min:sec)	Media
0-300	5	00:00:00 - 00:05:00	HeO ₂
300	55	00:05:00 - 01:00:00	85/15
			↓
300-180	2	01:00:00 - 01:02:00	HeO ₂
180-160	1	01:02:00 - 01:03:00	80/20
160	4	01:03:00 - 01:07:00	
160-150	1	01:07:00 - 01:08:00	
150	4	01:08:00 - 01:12:00	
150-140	1	01:12:00 - 01:13:00	
140	4	01:13:00 - 01:17:00	
140-130	1	01:17:00 - 01:18:00	
130	4	01:18:00 - 01:22:00	
130-120	1	01:22:00 - 01:23:00	
120	4	01:23:00 - 01:27:00	
120-110	1	01:27:00 - 01:28:00	
110	4	01:28:00 - 01:32:00	
110-100	1	01:32:00 - 01:33:00	
100	9	01:33:00 - 01:42:00	
100- 90	1	01:42:00 - 01:43:00	
90	14	01:43:00 - 01:57:00	
90- 80	1	01:57:00 - 01:58:00	
80	14	01:58:00 - 02:12:00	Air
80- 70	1	02:12:00 - 02:13:00	
70	14	02:13:00 - 02:27:00	
70- 60	1	02:27:00 - 02:28:00	
60	19	02:28:00 - 02:47:00	
60- 50	1	02:47:00 - 02:48:00	
50	25	02:48:00 - 03:13:00	↓

Table 8

INITIAL SCHEDULE 300-FOOT/60-MINUTE (Continued)

Depth(ft)	Time(min)	Elapsed Time (hr:min:sec)	Media
50-40	5	03:13:00 - 03:18:00	Air
40	25	03:18:00 - 03:43:00	↓
40-35	5	03:43:00 - 03:48:00	O ₂
35	10	03:48:00 - 03:58:00	↓
35-30	5	03:58:00 - 04:03:00	Air
30	25	04:03:00 - 04:28:00	↓
30-25	5	04:28:00 - 04:33:00	O ₂
25	20	04:33:00 - 04:53:00	↓
20-25	5	04:53:00 - 04:58:00	Air
20	40	04:58:00 - 05:38:00	↓
20-15	5	05:38:00 - 05:43:00	O ₂
15	30	05:43:00 - 06:13:00	↓
15-10	5	06:13:00 - 06:18:00	Air
10	55	06:18:00 - 07:13:00	↓
10-5	5	07:13:00 - 07:18:00	O ₂
5	40	07:18:00 - 07:58:00	↓
5-0	5	07:58:00 - 08:03:00	O ₂

Travel times are shown as separate entries throughout this schedule.

Table 9

INITIAL SCHEDULE SUMMARY 300-FOOT/60-MINUTE

Dive No.	Date	Subject	Principal Breathing Mixture	Surface Injection Rate	Time to Bottom	Total Time of Dive	Decompression Sickness
				liters/min	hr:min:sec	hr:min:sec	
1	13 May 65	Bruneau Mundy	HeO ₂ 85%/15% 80%/20%	Not Recorded	00:05:11	08:03:20	No
2	9 Sep 65	Taylor Wyatt	HeO ₂ 85%/15% 80%/20%	Not Recorded	00:05:05	08:02:50	No

3.3.2 Problems/Modifications

There were three dives made in this group. Dives 1 and 2 used the initial schedule. On Dive 1, the shift to 80% He 20% O₂ was made at 180 feet instead of at 300 feet, 2 minutes later than scheduled. Otherwise, both Dives 1 and 2 adhered closely to the initial schedule. No difficulties were encountered.

Dive 3 used Modification A Schedule (Appendix A, Table A-3). Again, no problems were encountered, although divers were held on six different occasions on descent between 120 feet and 300 feet for periods averaging about 20 seconds. They also used slower rates of travel on descent than the 60FPM prescribed in the schedule. These variations doubled the time required for descent as compared to the schedule. The reason for these changes was not recorded. Dive 3 adhered to Modification A Schedule except for these variations.

The two schedules are constructed differently. The initial schedule uses 10-foot intervals between decompression stops to 40 feet and then 5-foot intervals to the surface. Modification A Schedule uses 4-foot intervals between 160 feet and 60 feet and then uses 2-foot intervals up to 10 feet. Modification A Schedule extends the total time of dive from 08:03:00 to 08:43:00. About half of the 40 minute increase occurs in small increments between 50 feet and 10 feet; the other half occurs at the 10-foot depth. Modification A Schedule also uses Air down to 120 feet whereas the initial schedule uses 85% He 15% O₂ at the beginning of the dive.

A summary of the dive conducted on the Modification A Schedule is presented in Table 10. Modification A Schedule is presented as the final schedule in this dive group as Table A-3 in Appendix A.

Table 10

MODIFICATION A SCHEDULE SUMMARY 300-FOOT/60-MINUTE

Dive No.	Date	Subject	Principal Breathing Mixture	Surface Injection Rate	Time to Bottom	Total Time of Dive	Decompression Sickness
				liters/min	hr:min:sec	hr:min:sec	
3	6 Apr 66	Meeks Mesplay	HeO ₂ 85%/15% 80%/20%	Not Recorded	00:10:55	08:43:18	No

3.4 350-FOOT/15-MINUTE DIVES

3.4.1 Initial decompression schedule

The initial decompression schedule for this dive group is presented in Table 11 and the summary of dives conducted using this schedule is presented in Table 12.

Table 11

INITIAL SCHEDULE 350-FOOT/15-MINUTE

Depth(ft)	Time(min)	Elapsed Time (hr:min:sec)	Media
0-75	1	00:00:00 - 00:01:00	Air HeO ₂ 85/15 ↓
75	0.5	00:01:00 - 00:01:30	
75-350	5	00:01:30 - 00:06:30	
350	3.5	00:06:30 - 00:15:00	
350-170	3	00:15:00 - 00:18:00	
170-140	1	00:18:00 - 00:19:00	
140	2	00:19:00 - 00:21:00	
130	2	00:21:00 - 00:23:00	
120	2	00:23:00 - 00:25:00	
110	2	00:25:00 - 00:27:00	
100	2	00:27:00 - 00:29:00	Air ↓ O ₂ Air O ₂ Air O ₂ O ₂
90	5	00:29:00 - 00:34:00	
80	5	00:34:00 - 00:39:00	
70	10	00:39:00 - 00:49:00	
60	10	00:49:00 - 00:59:00	
50	10	00:59:00 - 01:09:00	
40	15	01:09:00 - 01:24:00	
30	25	01:24:00 - 01:49:00	
20	25	01:49:00 - 02:14:00	
10	25	02:14:00 - 02:39:00	
10	20	02:39:00 - 02:59:00	
10-0	10	02:59:00 - 03:09:00	

Times at the decompression stops include the time required for travel to next stop.

Table 12

INITIAL SCHEDULE SUMMARY 350-FOOT/15-MINUTE

Dive No.	Date	Subject	Principal Breathing Mixture	Surface Injection Rate	Time to Bottom	Total Time of Dive	Decompression Sickness
				liters/min	hr:min:sec	hr:min:sec	
1	1 Jun 67	Kennedy Wyatt	HeO ₂ 85%/15%	33.5 33.5	00:06:15	03:09:00	No
2	2 Jun 67	Mandible Jones	HeO ₂ 85%/15%	Not Recorded	00:06:30	03:09:00	No

3.4.2 Problems/Modifications

Only two dives were made in this group, both on the initial schedule. One minor deviation from schedule occurred on Dive 1 when divers remained one minute at 170 feet on ascent. This put them one minute behind schedule upon reaching 140 feet. The stop at 140 feet was shortened one minute and the schedule resumed. Otherwise, both dives adhered to the schedule. No problems were encountered on either dive.

The initial schedule, unmodified, appears as the final schedule for this dive group as Table A-4 in Appendix A.

3.5 350-FOOT/30-MINUTE DIVES

3.5.1 Initial Decompression Schedule

The initial decompression schedule for this dive group is presented in Table 13 and a summary of the dives conducted using this schedule is presented in Table 14.

Table 13
INITIAL SCHEDULE - 350-FOOT/30-MINUTE

Depth(ft)	Time(min)	Elapsed Time (hr:min:sec)	Media
0-50	1	00:00:00 - 00:01:00	Air
50-125	1	00:01:00 - 00:02:00	↓
125-200	1	00:02:00 - 00:03:00	HeO ₂
200-275	1	00:03:00 - 00:04:00	87/13
275-350	1	00:04:00 - 00:05:00	↓
350	25	00:05:00 - 00:30:00	
350-290	1	00:30:00 - 00:31:00	
290-230	1	00:31:00 - 00:32:00	
230-180	1	00:32:00 - 00:33:00	↓
180	1	00:33:00 - 00:34:00	HeO ₂
175	1	00:34:00 - 00:35:00	80/20
170	1	00:35:00 - 00:36:00	↓
165	1	00:36:00 - 00:37:00	
160	1	00:37:00 - 00:38:00	
155	1	00:38:00 - 00:39:00	
150	2	00:39:00 - 00:41:00	
145	2	00:41:00 - 00:43:00	
140	2	00:43:00 - 00:45:00	
135	2	00:45:00 - 00:47:00	
130	2	00:47:00 - 00:49:00	
125	2	00:49:00 - 00:51:00	
120	2	00:51:00 - 00:53:00	
115	2	00:53:00 - 00:55:00	↓
110	5	00:55:00 - 01:00:00	Air
106	5	01:00:00 - 01:05:00	↓
102	5	01:05:00 - 01:10:00	
98	5	01:10:00 - 01:15:00	
94	5	01:15:00 - 01:20:00	↓

Table 13

INITIAL SCHEDULE - 350-FOOT/30-MINUTE (Continued)

Depth(ft)	Time(min)	Elapsed Time (hr:min:sec)	Media
90	5	01:20:00 - 01:25:00	Air
86	5	01:25:00 - 01:30:00	
82	5	01:30:00 - 01:35:00	
78	5	01:35:00 - 01:40:00	
74	5	01:40:00 - 01:45:00	
70	5	01:45:00 - 01:50:00	
68	5	01:50:00 - 01:55:00	
66	5	01:55:00 - 02:00:00	
64	5	02:00:00 - 02:05:00	
62	5	02:05:00 - 02:10:00	
60	5	02:10:00 - 02:15:00	
58	5	02:15:00 - 02:20:00	
56	5	02:20:00 - 02:25:00	
54	5	02:25:00 - 02:30:00	
52	5	02:30:00 - 02:35:00	
50	5	02:35:00 - 02:40:00	
48	5	02:40:00 - 02:45:00	
46	5	02:45:00 - 02:50:00	
44	5	02:50:00 - 02:55:00	
42	5	02:55:00 - 03:00:00	
40	8	03:00:00 - 03:08:00	
38	8	03:08:00 - 03:16:00	
36	8	03:16:00 - 03:24:00	
34	8	03:24:00 - 03:32:00	
32	8	03:32:00 - 03:40:00	
30	16	03:40:00 - 03:56:00	
28	16	03:56:00 - 04:12:00	
26	16	04:12:00 - 04:28:00	
24	16	04:28:00 - 04:44:00	
22	16	04:44:00 - 05:00:00	
20	18	05:00:00 - 05:18:00	02
18	18	05:18:00 - 05:36:00	↓
16	18	05:36:00 - 05:54:00	Air
14	18	05:54:00 - 06:12:00	↓
12	18	06:12:00 - 06:30:00	02
10	18	06:30:00 - 06:48:00	

Table 13

INITIAL SCHEDULE - 350-FOOT/30-MINUTE (Continued)

Depth(ft)	Time(min)	Elapsed Time (hr:min:sec)	Media
10	30	06:40:00 - 07:18:00	Air
10	30	07:18:00 - 07:48:00	O ₂
10	30	07:48:00 - 08:18:00	Air
10	30	08:18:00 - 08:48:00	O ₂
10	30	08:48:00 - 09:18:00	Air
10	20	09:18:00 - 09:38:00	O ₂
10-0	10	09:38:00 - 09:48:00	O ₂

Times at the decompression stops include the time required for travel to next stop.

Table 14

INITIAL SCHEDULE SUMMARY 350-FOOT/30-MINUTE

Dive No.	Date	Subject	Principal Breathing Mixture	Surface Injection Rate	Time to Bottom	Total Time of Dive	Decompression Sickness
				liters/min	hr:min:sec	hr:min:sec	
1	21 Apr 66	Parkinson Lazaro	HeO ₂ 87%/13% 80%/20%	Not Recorded	00:05:14	09:48:00	No
2	22 Sep 66	Casse Reedy	HeO ₂ 87%/13% 80%/20%	Not Recorded	00:05:10	09:48:00	No

3.5.2 Problems/Modifications

Both dives under this schedule were conducted without incident. Dive 1 conformed to schedule except for minor variations in rates of travel on descent and in the interval between 180 feet and 170 feet on ascent.

Dive 2 used faster rates of travel between decompression stops in the interval between 180 feet and 30 feet than prescribed in the schedule. The rates are compared as follows:

Depth Intervals (Feet)	Rates of Travel Between Stops (Feet per minute)	
	<u>Initial Schedule</u>	<u>Dive 2</u>
180-110	15	30
110- 70	12	30
70- 30	6	12

The available records for Dive 2 are incomplete. They indicate that the dive was completed on time with both divers "OK". However, the schedule details for the interval between 30 feet and the surface were not recorded. Except for the rates of travel, Dive 2 followed the initial schedule to the 30-foot depth at elapsed time 03:40:00.

The initial schedule appears, unmodified, as the final schedule for this dive group as Table A-5 in Appendix A.

3.6 350-FOOT/60-MINUTE DIVES

3.6.1 Initial Decompression Schedule

The initial decompression schedule used for this series of dives is presented in Table 15 and a summary of the dives conducted under this schedule is presented in Table 16.

Table 15
INITIAL SCHEDULE 350-FOOT/60-MINUTE

Depth(ft)	Time(min)	Elapsed Time (hr:min:sec)	Media
0-50	1	00:00:00 - 00:01:00	HeO ₂ 87/13
50-350	4	00:01:00 - 00:05:00	
350	55	00:05:00 - 01:00:00	
350-200	2	01:00:00 - 01:02:00	HeO ₂ 80/20
200	4	01:02:00 - 01:06:00	
200-170	1	01:06:00 - 01:07:00	
170	4	01:07:00 - 01:11:00	Air
170-160	1	01:11:00 - 01:12:00	
160	4	01:12:00 - 01:16:00	
160-150	1	01:16:00 - 01:17:00	Air
150	4	01:17:00 - 01:21:00	
150-140	1	01:21:00 - 01:22:00	
140	4	01:22:00 - 01:26:00	Air
140-130	1	01:26:00 - 01:27:00	
130	4	01:27:00 - 01:31:00	
130-120	1	01:31:00 - 01:32:00	Air
120	9	01:32:00 - 01:41:00	
120-110	1	01:41:00 - 01:42:00	
110	9	01:42:00 - 01:51:00	Air
110-100	1	01:51:00 - 01:52:00	
100	9	01:52:00 - 02:01:00	
100- 90	1	02:01:00 - 02:02:00	Air
90	14	02:02:00 - 02:16:00	
90-80	1	02:16:00 - 02:17:00	
80	14	02:17:00 - 02:31:00	Air
80-70	1	02:31:00 - 02:32:00	
70	20	02:32:00 - 02:52:00	
70-60	5	02:52:00 - 02:57:00	Air
60	25	02:57:00 - 03:22:00	
60-50	5	03:22:00 - 03:27:00	
50	15	03:27:00 - 03:42:00	Air
150-45	5	03:42:00 - 03:47:00	
45	25	03:47:00 - 04:12:00	

Table 15

INITIAL SCHEDULE 350-FOOT/60-MINUTE (Continued)

Depth(ft)	Time(min)	Elapsed Time (hr:min:sec)	Media
45-40	5	04:12:00 - 04:17:00	Air
40	30	04:17:00 - 04:47:00	↓
40-35	5	04:47:00 - 04:52:00	02
35	25	04:52:00 - 05:17:00	↓
35-30	5	05:17:00 - 05:22:00	Air
30	55	05:22:00 - 06:17:00	↓
30-25	5	06:17:00 - 06:22:00	02
25	25	06:22:00 - 06:47:00	↓
25-20	5	06:47:00 - 06:52:00	Air
20	85	06:52:00 - 08:17:00	↓
20-15	5	08:17:00 - 08:22:00	02
15	40	08:22:00 - 09:02:00	↓
15-10	5	09:02:00 - 09:07:00	Air
10	30	09:07:00 - 09:37:00	02
10	30	09:37:00 - 10:07:00	Air
10	30	10:07:00 - 10:37:00	02
10	30	10:37:00 - 11:07:00	Air
10	30	11:07:00 - 11:37:00	02
10	20	11:37:00 - 11:57:00	02
10-0	10	11:57:00 - 12:07:00	02

Travel times are shown as separate entries throughout the schedule.

Table 16

INITIAL SCHEDULE SUMMARY 350-FOOT/60-MINUTE

Dive No.	Date	Subject	Principal Breathing Mixture	Surface Injection Rate	Time to Bottom	Total Time of Dive	Decompression Sickness
				liters/min	hr:min:sec	hr:min:sec	
1	14 Oct 65	Garrahan Bigger	HeO ₂ 87%/13% 80%/20%	Not Recorded	00:05:10	13:28:30	Garrahan

3.6.2 Problems/Modifications

Garrahan experienced decompression sickness on Dive 1 which was conducted on the initial schedule. He reported "inkle, left knee" at 15 feet. He was successfully recompressed with relief of symptoms at 30 feet. Bigger accompanied the treatment. The treatment period extended the total time of dive to 13:28:30 as compared to the scheduled 12:07:00.

The initial schedule included relatively long stops at 10-foot increments up to 50 feet. The distance between stops was then decreased to 5 feet between the 50-foot depth and the 10-foot depth. The number of decompression stops was significantly increased in Modification A Schedule. Five-foot intervals were used between 200 feet and 120 feet. Two-foot intervals were used between 120 feet and 10 feet. The total time of dive in the Modification A Schedule was extended slightly to 12:13:00 as compared to 12:07:00 in the initial schedule.

Brauner experienced decompression sickness on Dive 2 which was conducted on Modification A Schedule. He felt a twinge in his left knee at 32 feet. He was returned to 50 feet where all symptoms were relieved. Anderson accompanied the treatment. Seven decompression stops between 195 feet and 98 feet varied one minute each from schedule. These deviations and the treatment period for Brauner extended the total time of dive to 13:55:20 as compared to the scheduled 12:13:00.

Modification B Schedule extended the total time of dive to 14:12:00. This was done primarily by slightly increasing the length of decompression stops between 70 feet and 10 feet as compared to those in Modification A Schedule. Dives conducted under Modification A Schedule and Modification B Schedule are summarized in Tables 17 and 18. These two modified schedules are quite similar in their basic construction; they are compared in detail in Table 19.

Dive 3 adhered to Modification B Schedule. Descent to 75 feet was 40 seconds behind schedule, accounting for the delay in reaching bottom. Mullens developed a rash on his back and stomach at 70 feet on ascent. He was given O₂ for 20 minutes, the rash disappearing completely during that time. Both he and Sundstrom continued the schedule during and after treatment, finishing at the scheduled time of 14:12:00.

Modification B Schedule is presented as the final schedule for this dive group as Table A-6 in Appendix A.

Table 17

MODIFICATION A SCHEDULE SUMMARY 350-FOOT/60-MINUTE

Dive No.	Date	Subject	Principal Breathing Mixture	Surface Injection Rate	Time to Bottom	Total Time of Dive	Decompression Sickness
				liters/min	hr:min:sec	hr:min:sec	
2	14 Apr 66	Anderson Brauner	HeO ₂ 87%/13% 80%/20%	Not Recorded	00:06:07	13:55:20	Brauner

Table 18

MODIFICATION B SCHEDULE SUMMARY 350-FOOT/60-MINUTE

Dive No.	Date	Subject	Principal Breathing Mixture	Surface Injection Rate	Time to Bottom	Total Time of Dive	Decompression Sickness
				liters/min	hr:min:sec	hr:min:sec	
3	26 Apr 66	Mullen Sundstrom	HeO ₂ 87%/13% 80%/20%	Not Recorded	00:05:50	14:12:00	Mullen

Table 19

MODIFICATION SCHEDULE COMPARISONS 350-FOOT/60-MINUTE

Depth (ft)		Time (min)		Breathing Mixture	
Schedule		Schedule		Schedule	
Mod A	Mod B	Mod A	Mod B	Mod A	Mod B
0-120	0-125	2	2	Air	Air
120	125	0.5	0.5	HeO ₂	HeO ₂
120-350	125-350	3.5	3.5	87/13	87/13
	350	54	54	↓	↓
	350-250	2	2	HeO ₂	HeO ₂
	250-200	1	1	80/20	80/20
	200	2	1	↓	↓
	195	2	1		
	190	2	1		
	185	2	1		
	180	2	1		
	175	2	1		
	170	2	1		
	165	2	1		
	160	2	2		
--	156	--	2		
155	--	2	--		
--	152	--	2		
150	--	2	--		
--	148	--	2		
145	--	2	--		
--	144	--	2		
140	140	2	2		
--	136	--	2		
135	--	2	--		
--	132	--	2		
130	130	2	2		
--	128	--	2		
--	126	--	2		
--	124	--	2		
--	122	--	2		

Table 19

MODIFICATION SCHEDULE COMPARISONS 350-FOOT/60-MINUTE
(Continued)

Depth(ft)		Time(min)		Breathing Mixture		
Schedule		Schedule		Schedule		
Mod A	Mod B	Mod A	Mod B	Mod A	Mod B	
120		2	2	He02	He02	
118		2	2	80/20	80/20	
116		2	2	↓	↓	
114		2	2			
112		2	2			
110		2	2			
108		2	2			
106		2	2			
104		2	2			
102		2	2			
100		2	3		Air	
98		2	3		↓	
96		2	3	↓		
94		2	3			
92		2	3			
90		3	3			
88		3	3			
86		3	3			
84		3	3			
82		3	3			
80		3	3			
78		3	3	↓		
76		3	3			
74		3	3			
72		3	3			
70		8	10			
68		8	10			
66		8	10			
64		8	10			
62		8	10			
60		8	10			
58		8	10			
56		8	10			

Table 19
MODIFICATION SCHEDULE COMPARISONS 350-FOOT/60-MINUTE
(Continued)

Depth (ft)	Time (min)		Breathing Mixture	
Schedule	Schedule		Schedule	
Mod A Mod B	Mod A	Mod B	Mod A	Mod B
54	8	10	Air	Air
52	8	10		
50	8	10		
48	8	10		
46	8	10		
44	8	10		
42	8	10		
40	14	21		
38	14	21		
36	14	21		
34	14	21		
32	14	21		
30	18	21		
28	18	21		
26	18	21		
24	18	21		
22	18	21		
20	24	30	O ₂	O ₂
18	24	30	Air	Air
16	24	30	O ₂	O ₂
14	24	30	Air	Air
12	24	30	O ₂	O ₂
10	30	30	Air	Air
10	30	30	O ₂	O ₂
10	30	30	Air	Air
10	30	30	O ₂	O ₂
10	30	30	Air	Air
10	20	20	O ₂	O ₂
10-0	10	10	O ₂	O ₂

TOTAL ELAPSED TIME:

Initial Schedule
Modification A Schedule
Modification B Schedule

12:07:00
12:13:00
14:12:00

3.7 400-FOOT/15-MINUTE DIVES

3.7.1 Initial Decompression Schedule

The initial decompression schedule for this dive group is presented in Table 20 and the summary of dives conducted under this schedule is presented in Table 21.

Table 20

INITIAL SCHEDULE 400-FOOT/15-MINUTE

Depth(ft)	Time(min)	Elapsed Time (hr:min:sec)	Media
0-75	1	00:00:00 - 00:01:00	Air
75	1	00:01:00 - 00:02:00	He02
75-400	4	00:02:00 - 00:06:00	90/10
400	10	00:06:00 - 00:15:00	
400-220	3	00:15:00 - 00:18:00	
220-190	1	00:18:00 - 00:19:00	
190	1	00:19:00 - 00:20:00	
180	1	00:20:00 - 00:21:00	
170	2	00:21:00 - 00:23:00	
160	2	00:23:00 - 00:25:00	
150	2	00:25:00 - 00:27:00	
140	2	00:27:00 - 00:29:00	
130	2	00:29:00 - 00:31:00	
120	5	00:31:00 - 00:36:00	
110	5	00:36:00 - 00:41:00	
100	5	00:41:00 - 00:46:00	Air
90	5	00:46:00 - 00:51:00	
80	10	00:51:00 - 01:01:00	
70	10	01:01:00 - 01:11:00	
60	15	01:11:00 - 01:26:00	
50	15	01:26:00 - 01:41:00	
40	25	01:41:00 - 02:06:00	02
30	25	02:06:00 - 02:31:00	Air
20	25	02:31:00 - 02:56:00	02
20	25	02:56:00 - 03:21:00	Air
10	30	03:21:00 - 03:51:00	02
10	30	03:51:00 - 04:21:00	Air
10	20	04:21:00 - 04:41:00	02
10-0	10	04:41:00 - 04:51:00	02

Times at decompression stop include the time required for travel to next stop.

Table 21

INITIAL SCHEDULE SUMMARY 400-FOOT/15-MINUTE

Dive No.	Date	Subject	Principal Breathing Mixture	Surface Injection Rate	Time to Bottom	Total Time of Dive	Decompression Sickness
				liters/min	hr:min:sec	hr:min:sec	
1	5 Jun 67	Mullen Mulally	HeO ₂ 90%/10%	Not Recorded	00:07:40	04:51:00	No
2	6 Jun 67	Rudin Meeks	HeO ₂ 90%/10%	35.0 37.0	00:08:13	04:52:00	Rudin Meeks

3.7.2 Problems/Modifications

During descent on Dives 1 and 2, divers were held at the 75-foot depth and then descended to the bottom depth more slowly than prescribed in the schedule. This extended the descent times as indicated in Table 21. Mullen, on Dive 1, reported that the "gas seemed real hot" on the way down. He experienced dizziness and a little nausea upon reaching bottom depth. This cleared up when the system was purged. His clamshell helmet was apparently leaking air on descent.

During ascent on Dive 2, O₂ pressure was lost for 40 seconds at the 10-foot depth. The 30-minute O₂ stop at this depth was extended 1 minute as a result. This increased the total time of Dive 2 to 04:52:00.

Both Rudin and Meeks experienced decompression sickness after Dive 2. Symptoms began 1-1/2 hours after returning to surface. Rudin had pain in the right knee. Meeks had pain in both knees and a sore right thigh. They were both successfully treated with recompression.

As a result of the experience on Dive 2, the schedule was changed radically for Dives 3 and 4. The total time of dive was extended 3 hours, primarily by increasing the time periods on O₂ and Air at the 10-foot depth. A mixture of 80% - 20% HeO₂ was also used in addition to 90% 10% HeO₂. Dives 3 and 4 adhered to the revised schedule (Modification A Schedule) except for the final ascent from 10 feet to the surface. Only 10 seconds were scheduled for this ascent. Dive 2 required 1 minute for this ascent and Dive 4 required 1 minute 40 seconds. This accounts for the small increase in the total time of dive for these two dives as compared to the scheduled time of 07:51:10.

Pratt suffered decompression sickness after surfacing from Dive 4, experiencing pain in his right leg. He was successfully treated with recompression.

The two dives using Modification A Schedule are summarized in Table 22. This schedule is compared in detail with the initial schedule in Table 23. Modification A Schedule appears as the final schedule for this dive group as Table A-7 in Appendix A.

Table 22

MODIFICATION A SCHEDULE SUMMARY 400-FOOT/15-MINUTE

Dive No.	Date	Subject	Principal Breathing Mixture	Surface Injection Rate	Time to Bottom	Total Time of Dive	Decompression Sickness
				liters/min	hr:min:sec	hr:min:sec	
3	14 Jun 67	May Cato	HeO ₂ 90%/10% 80%/20%	34.0 36.5	00:05:15	07:51:45	No
4	15 Jun 67	Pratt Sundstrom	HeO ₂ 90%/10% 80%/20%	34.5 36.0	00:04:45	07:52:40	Pratt

Table 23

SCHEDULE COMPARISONS 400-FOOT/15-MINUTE

Depth (ft)		Time (min)		Breathing Mixture	
Schedule		Schedule		Schedule	
Init.	Mod A	Init.	Mod A	Init.	Mod A
0-75	0-100	1	1	Air	Air
- -	100	- -	0.5	- -	HeO ₂
75-400	100-400	4	4	HeO ₂	90/10
400	400	10	9.5	90/10	↓
400-220	400-220	3	3		HeO ₂
220-190	220-200	1	1		80/20
- -	200	- -	1		↓
	190	1	1		
	180	1	1		
	170	2	2		
	160	2	1		
	150	2	2		
	140	2	2		
	130	2	2		
	120	5	5		
	110	5	5		
	100	5	5	Air	Air
	90	5	5	↓	↓
	80	10	15		
	70	10	10		
	60	15	15		
	50	15	15		
	40	25	35	O ₂	↓
	30	25	30	Air	O ₂
	20	25	15	O ₂	Air
	20	25	15	Air	Air

Table 23

SCHEDULE COMPARISONS 400-FOOT/15-MINUTE (Continued)

Depth (ft)		Time (min)		Breathing Mixture	
Schedule		Schedule		Schedule	
Init.	Mod A	Init.	Mod A	Init.	Mod A
- -	20	- -	30	- -	Air
- -	20	- -	30	- -	O ₂
- -	10	- -	30	- -	Air
- -	10	- -	30	- -	O ₂
- -	10	- -	30	- -	Air
	10	30	10	O ₂	O ₂
	10	30	10	Air	Air
	10	20	10	O ₂	O ₂
	10-0	10	0.17	O ₂	O ₂

TOTAL ELAPSED TIME:

Initial Schedule 04:51:00
Modification A 07:51:00

3.8 400-FOOT/30-MINUTE DIVES

3.8.1 Initial Decompression Schedule

The initial decompression schedule for this dive group is presented in Table 24 and the summary of dives conducted under this schedule is presented in Table 25.

Table 24

INITIAL SCHEDULE 400-FOOT/30-MINUTE

Depth(ft)	Time(min)	Elapsed Time (hr:min:sec)	Media
0-100	2	00:00:00 - 00:02:00	Air
100	0.5	00:02:00 - 00:02:30	HeO ₂
100-400	3	00:02:30 - 00:05:30	90/10
400	24.5	00:05:30 - 00:30:00	
400-340	1	00:30:00 - 00:31:00	
340-280	1	00:31:00 - 00:32:00	
280-220	1	00:32:00 - 00:33:00	
220	1	00:33:00 - 00:34:00	HeO ₂
215	1	00:34:00 - 00:35:00	80/20
210	1	00:35:00 - 00:36:00	
205	1	00:36:00 - 00:37:00	
200	1	00:37:00 - 00:38:00	
195	1	00:38:00 - 00:39:00	
190	1	00:39:00 - 00:40:00	
185	1	00:40:00 - 00:41:00	
180	2	00:41:00 - 00:43:00	
175	2	00:43:00 - 00:45:00	
170	2	00:45:00 - 00:47:00	
165	2	00:47:00 - 00:49:00	
160	2	00:49:00 - 00:51:00	
155	2	00:51:00 - 00:53:00	
150	2	00:53:00 - 00:55:00	
145	2	00:55:00 - 00:57:00	
140	4	00:57:00 - 01:01:00	
135	4	00:01:00 - 01:05:00	
130	4	01:05:00 - 01:09:00	
125	4	01:09:00 - 01:13:00	
120	4	01:13:00 - 01:17:00	
115	4	01:17:00 - 01:21:00	
110	4	01:21:00 - 01:25:00	
105	4	01:25:00 - 01:29:00	

Table 24

INITIAL SCHEDULE 400-FOOT/30-MINUTE (Continued)

Depth (ft)	Time (min)	Elapsed Time (hr:min:sec)	Media
100	3	01:29:00 - 01:32:00	Air ↓
98	3	01:32:00 - 01:35:00	
96	3	01:35:00 - 01:38:00	
94	3	01:38:00 - 01:41:00	
92	3	01:41:00 - 01:44:00	
90	3	01:44:00 - 01:47:00	
88	3	01:47:00 - 01:50:00	
86	3	01:50:00 - 01:53:00	
84	3	01:53:00 - 01:56:00	
82	3	01:56:00 - 01:59:00	
80	4	01:59:00 - 02:03:00	
78	4	02:03:00 - 02:07:00	
76	4	02:07:00 - 02:11:00	
74	4	02:11:00 - 02:15:00	
72	4	02:15:00 - 02:19:00	
70	4	02:19:00 - 02:23:00	
68	4	02:23:00 - 02:27:00	
66	4	02:27:00 - 02:31:00	
64	4	02:31:00 - 02:35:00	
62	4	02:35:00 - 02:39:00	
60	6	02:39:00 - 02:45:00	
58	6	02:45:00 - 02:51:00	
56	6	02:51:00 - 02:57:00	
54	6	02:57:00 - 03:03:00	
52	6	03:03:00 - 03:09:00	
50	8	03:09:00 - 03:17:00	
48	8	03:17:00 - 03:25:00	
46	8	03:25:00 - 03:33:00	
44	8	03:33:00 - 03:41:00	
42	8	03:41:00 - 03:49:00	
40	16	03:49:00 - 04:05:00	
38	16	04:05:00 - 04:21:00	
36	16	04:21:00 - 04:37:00	
34	16	04:37:00 - 04:53:00	
32	16	04:53:00 - 05:09:00	
30	20	05:09:00 - 05:29:00	
28	20	05:29:00 - 05:49:00	
26	20	05:49:00 - 06:09:00	
24	20	06:09:00 - 06:29:00	
22	20	06:29:00 - 06:49:00	

Table 24

Initial Schedule 400-FOOT/30-MINUTE (Continued)

Depth(ft)	Time(min)	ELapsed Time (hr:min:sec)	Media
20	26	06:49:00 - 07:14:00	O ₂
18	25	07:14:00 - 07:39:00	Air
16	25	07:39:00 - 08:04:00	O ₂
14	25	08:04:00 - 08:29:00	Air
12	25	08:29:00 - 08:54:00	O ₂
10	30	08:54:00 - 09:24:00	Air
10	30	09:24:00 - 09:54:00	O ₂
10	30	09:54:00 - 10:24:00	Air
10	30	10:24:00 - 10:54:00	O ₂
10	30	10:54:00 - 11:24:00	Air
10	20	11:24:00 - 11:44:00	O ₂
10-0	10	11:44:00 - 11:54:00	O ₂

Times at the decompression stops include the time required for travel to the next stop.

Table 25
INITIAL SCHEDULE SUMMARY 400-FOOT/30-MINUTE

Dive No.	Date	Subject	Principal Breathing Mixture	Surface Injection Rate	Time to Bottom	Total Time of Dive	Decompression Sickness
				liters/min	hr:min:sec	hr:min:sec	
1	3 May 66	Rudin Buckner	HeO ₂ 90%/10% 80%/20%	Not Recorded	00:06:02	11:54:00	No
2	5 May 66	Kennedy Mulally	HeO ₂ 90%/10% 80%/20%	Not Recorded	00:06:22	11:54:30	No
3	27 Sep 66	Taylor Stubbs	HeO ₂ 90%/10% 80%/20%	Not Recorded	00:06:20	11:54:15	No
4	29 Sep 66	Donaldson Casse	HeO ₂ 90%/10% 80%/20%	Not Recorded	00:07:55	11:54:00	No

3.8.2 Problems/Modifications

All four dives in this group were executed using the initial schedule. Kennedy, Stubbs, and Donaldson experienced ear trouble on descent during Dives 2, 3, and 4 respectively. Descent time was extended briefly on these dives for this reason. Descent was also slow on Dive 1. On Dive 4, divers went on 80%-20% HeO₂ breathing mixture at 340 feet on ascent instead of at 220 feet as scheduled. This added two minutes to the total use of this mixture. In all other aspects all four dives conformed to the schedule and no problems were encountered.

This schedule with minor variations in rates of travel on descent, was also tested in 1968 for use with the Advanced Diving System (ADS-IV). It was first tested with 80%-20% HeO₂ as a breathing mixture throughout the ascent instead of switching to air. Problems were encountered with decompression sickness. It was then tested using Air beginning at 100 feet as presented in Table 24 of this report. Fewer problems were encountered. Details on these ADS-IV tests are contained in U.S. Navy Experimental Diving Unit Research Report 4-70.

The initial schedule appears, unmodified, as the final schedule for this dive group as Table A-8 in Appendix A.

3.9 400-FOOT/60-MINUTE DIVES

3.9.1 Initial Decompression Schedule

The initial decompression schedule for this dive group is presented in Table 26 and the summary of dives conducted using this schedule is presented in Table 27.

Table 26
INITIAL SCHEDULE 400-FOOT/60-MINUTE

Depth(ft)	Time(min)	Elapsed Time (hr:min:sec)	Media
0-50	1	00:00:00 - 00:01:00	Air ↓ HeO ₂ 90/10 ↓ HeO ₂ 80/20 ↓
50-100	1	00:01:00 - 00:02:00	
100-200	1	00:02:00 - 00:03:00	
200-300	1	00:03:00 - 00:04:00	
300-400	1	00:04:00 - 00:05:00	
400	55	00:05:00 - 01:00:00	
400-350	1	01:00:00 - 01:01:00	
350-300	1	01:01:00 - 01:02:00	
300-250	1	01:02:00 - 01:03:00	
250	3	01:03:00 - 01:06:00	
240	3	01:06:00 - 01:09:00	
230	3	01:09:00 - 01:12:00	
220	3	01:12:00 - 01:15:00	
210	3	01:15:00 - 01:18:00	
200	7	01:18:00 - 01:25:00	
190	7	01:25:00 - 01:32:00	
180	7	01:32:00 - 01:39:00	
170	7	01:39:00 - 01:46:00	
160	7	01:46:00 - 01:53:00	
150	2	01:53:00 - 01:55:00	
148	2	01:55:00 - 01:57:00	
146	2	01:57:00 - 01:59:00	
144	2	01:59:00 - 02:01:00	
142	2	02:01:00 - 02:03:00	
140	2	02:03:00 - 02:05:00	
138	2	02:05:00 - 02:07:00	
136	2	02:07:00 - 02:09:00	
134	2	02:09:00 - 02:11:00	
132	2	02:11:00 - 02:13:00	
130	2	02:13:00 - 02:15:00	

Table 26

INITIAL SCHEDULE 400-FOOT/60-MINUTE (Continued)

Depth(ft)	Time(min)	Elapsed Time (hr:min:sec)	Media
128	2	02:15:00 - 02:17:00	HeO ₂ 80/20
126	2	02:17:00 - 02:19:00	
124	2	02:19:00 - 02:21:00	↓ Air
122	2	02:21:00 - 02:23:00	
120	4	02:23:00 - 02:27:00	↓
118	4	02:27:00 - 02:31:00	
116	4	02:31:00 - 02:35:00	
114	4	02:35:00 - 02:39:00	
112	4	02:39:00 - 02:43:00	
110	4	02:43:00 - 02:47:00	
108	4	02:47:00 - 02:51:00	
106	4	02:51:00 - 02:55:00	
104	4	02:55:00 - 02:59:00	
102	4	02:59:00 - 03:03:00	
100	4	03:03:00 - 03:07:00	
98	4	03:07:00 - 03:11:00	
96	4	03:11:00 - 03:15:00	
94	4	03:15:00 - 03:19:00	
92	4	03:19:00 - 03:23:00	
90	6	03:23:00 - 03:29:00	
88	6	03:29:00 - 03:35:00	
86	6	03:35:00 - 03:41:00	
84	6	03:41:00 - 03:47:00	
82	6	03:47:00 - 03:53:00	
80	6	03:53:00 - 03:59:00	
78	6	03:59:00 - 04:05:00	
76	6	04:05:00 - 04:11:00	
74	6	04:11:00 - 04:17:00	
72	6	04:17:00 - 04:23:00	
70	18	04:23:00 - 04:41:00	
68	18	04:41:00 - 04:59:00	
66	18	04:59:00 - 05:17:00	
64	18	05:17:00 - 05:35:00	
62	18	05:35:00 - 05:53:00	
60	18	05:53:00 - 06:11:00	
58	18	06:11:00 - 06:29:00	
56	18	06:29:00 - 06:47:00	
54	18	06:47:00 - 07:05:00	
52	18	07:05:00 - 07:23:00	
50	26	07:23:00 - 07:49:00	↓

Table 26

INITIAL SCHEDULE 400-FOOT/60-MINUTE (Continued)

Depth(ft)	Time(min)	Elapsed Time (hr:min:sec)	Media
48	26	07:49:00 - 08:15:00	Air ↓
46	26	08:15:00 - 08:41:00	
44	26	08:41:00 - 09:07:00	
42	26	09:07:00 - 09:33:00	
40	26	09:33:00 - 09:59:00	
38	26	09:59:00 - 10:25:00	
36	26	10:25:00 - 10:51:00	
34	26	10:51:00 - 11:17:00	
32	26	11:17:00 - 11:43:00	
30	28	11:43:00 - 12:11:00	
28	28	12:11:00 - 12:39:00	
26	28	12:39:00 - 13:07:00	
24	28	13:07:00 - 13:35:00	
22	28	13:35:00 - 14:03:00	
20	30	14:03:00 - 14:33:00	
18	30	14:33:00 - 15:03:00	
16	30	15:03:00 - 15:33:00	
14	30	15:33:00 - 16:03:00	
12	30	16:03:00 - 16:33:00	
10	30	16:33:00 - 17:03:00	
10	30	17:03:00 - 17:33:00	0 ₂
10	30	17:33:00 - 18:03:00	Air
10	30	18:03:00 - 18:33:00	0 ₂
10	30	18:33:00 - 19:03:00	Air
10	20	19:03:00 - 19:23:00	0 ₂
10-0	10	19:23:00 - 19:33:00	0 ₂

Times at the decompression stops include the time required for travel to next stop.

Table 27

INITIAL SCHEDULE SUMMARY 400-FOOT/60-MINUTE

Dive No.	Date	Subject	Principal Breathing Mixture	Surface Injection Rate	Time to Bottom	Total Time of Dive	Decompression Sickness
				liters/min	hr:min:sec	hr:min:sec	
1	12 May 66	Coffman Hendry	HeO ₂ 90%/10% 80%/20%	Not Recorded	00:05:15	19:33:00	No
5	14 Jul 66	Mesplay Mulally	HeO ₂ 90%/10% 80%/20%	Not Recorded	00:07:15	19:32:47	No
6	6 Oct 66	Donaldson Stubbs Mullen	HeO ₂ 90%/10% 80%/20%	Not Recorded	00:10:45	21:38:00	Donaldson
7	18 Oct 66	Reedy Blackburn Bruneau	HeO ₂ 90%/10% 80%/20%	Not Recorded	00:07:45	19:33:20	No

3.9.2 Problems/Modifications

Seven dives were made in this series. Dive 1 was made without incident using the initial schedule. The initial schedule was then shortened from a total time of dive of 19:33:00 to 17:03:00 for Dives 2 and 3 (Modification A Schedule). Decompression sickness occurred on Dive 3. The Modification A Schedule was then increased to 18:18:00 for Dive 4 (Modification B Schedule). Decompression sickness also occurred on Dive 4. As a result of the difficulties encountered with the two modified schedules, use of the initial schedule was resumed for the remaining three dives in the series (Dives 5, 6, 7).

The only problem with decompression sickness on the four dives conducted with the initial schedule occurred on Dive 6. Donaldson reported pain in his left knee and groin at 44 feet. He was successfully recompressed with Stubbs and Mullen accompanying the treatment. Dives 1 and 5 were without incident. On Dive 7, Bruneau and Reedy had some difficulty on the bottom. Bruneau had a foot cramp and Reedy reported "hard time breathing". However, they completed the schedule without incident.

The three dives made with the modified schedules are summarized in Tables 28 and 29.

Bruneau became sick on the bottom on Dive 2. Bottom time was therefore reduced from 60 minutes to 38 minutes 45 seconds. The remainder of Dive 2 was conducted without incident. However, there were 10 variations of one minute each from scheduled times at decompression stops between 200 feet and 32 feet as well as several variations of +30 seconds. These variations produced a cumulative increase of 5 minutes in the total time of dive. Dive 3 was conducted according to schedule; however, Garrahan experienced a slight ache in his right knee within an hour after returning to surface. He was successfully treated with recompression.

Dive 4, conducted on the Modification B Schedule, adhered to this schedule. Lazaro experienced decompression sickness following the dive. He had pain in the front portion of the calf on his left leg. He was successfully treated with recompression commencing 6 hours 24 minutes after the dive.

Table 30 presents a comparison of the initial schedule and the two modified schedules tested for this dive group.

The initial schedule appears unmodified as the final decompression schedule for this dive group as Table A-9 in Appendix A.

Table 28

MODIFICATION A SCHEDULE SUMMARY 400-FOOT/60-MINUTE

Dive No.	Date	Subject	Principal Breathing Mixture	Surface Injection Rate	Time to Bottom	Total Time of Dive	Decompression Sickness
				liters/min	hr:min:sec	hr:min:sec	
2	19 May 66	Bruneau Sundstrom	HeO ₂ 90%/10% 80%/20%	Not Recorded	00:05:15	16:46:50*	No
3	26 May 66	Garrahan Taylor	HeO ₂ 90%/10% 80%/20%	Not Recorded	00:05:15	17:03:00	Garrahan

* Dive 2 had a short bottom time. Subjects began ascent 21 minutes 15 seconds early

Table 29

MODIFICATION B SCHEDULE SUMMARY 400-FOOT/60-MINUTE

Dive No.	Date	Subject	Principal Breathing Mixture	Surface Injection Rate	Time to Bottom	Total Time of Dive	Decompression Sickness
				liters/min	hr:min:sec	hr:min:sec	
4	9 Jun 66	Lazaro Meeks	HeO ₂ 90%/10% 80%/20%	Not Recorded	00:12:16	18:18:25	Lazaro

Table 30

SCHEDULE COMPARISONS 400-FOOT/60-MINUTE

Depth (ft)	Time (min)			Breathing Mixture		
Schedule	Schedule			Schedule		
All	Init.	Mod A	Mod B	Init.	Mod A	Mod B
0-50	1	1	1	Air	Air	Air
50-100	1	1	1	↓	↓	↓
100-200	1	1	1	HeO ₂	HeO ₂	HeO ₂
200-300	1	1	1	90/10	90/10	90/10
300-400	1	1	1	↓	↓	↓
400	55	55	55			
400-350	1	1	1			
350-300	1	1	1			
300-250	1	1	1			
250	3	3	3			
240	3	3	3			
230	3	3	3			
220	3	3	3			
210	3	3	3			
200	7	7	7	HeO ₂	HeO ₂	HeO ₂
190	7	7	7	80/20	80/20	80/20
180	7	7	7	↓	↓	↓
170	7	7	7			
160	7	7	7			
150	2	2	2			
148	2	2	2			
146	2	2	2			
144	2	2	2			
142	2	2	2			
140	2	2	2			
138	2	2	2			
136	2	2	2			
134	2	2	2			
132	2	2	2	↓	↓	↓

Table 30

SCHEDULE COMPARISONS 400-FOOT/60-MINUTE (Continued)

Depth (ft)	Time (min)			Breathing Mixture		
Schedule	Schedule			Schedule		
All	Init.	Mod A	Mod B	Init.	Mod A	Mod B
130	2	2	2	HeO ₂	HeO ₂	HeO ₂
128	2	2	2	80/20	80/20	80/20
126	2	2	2	↓	↓	↓
124	2	2	2			
122	2	2	2			
120	4	4	4	Air	Air	Air
118	4	4	4	↓	↓	↓
116	4	4	4			
114	4	4	4			
112	4	4	4			
110	4	4	4			
108	4	4	4			
106	4	4	4			
104	4	4	4			
102	4	4	4			
100	4	4	4			
98	4	4	4			
96	4	6	6			
94	4	6	6			
92	4	6	6			
90	6	6	6			
88	6	6	6			
86	6	6	6			
84	6	6	6			
82	6	6	6			
80	6	6	6			
78	6	6	6			
76	6	6	6			
74	6	6	6			
72	6	6	6	↓	↓	↓

Table 30

SCHEDULE COMPARISONS 400-FOOT/60-MINUTE (Continued)

Depth (ft)	Time (min)			Breathing Mixture		
Schedule	Schedule			Schedule		
All	Init.	Mod A	Mod B	Init.	Mod A	Mod B
70	18	15	15	Air	Air	Air
68	18	15	15			
66	18	15	15			
64	18	15	15			
62	18	15	15			
60	18	15	15			
58	18	15	15			
56	18	15	15			
54	18	15	15			
52	18	15	15			
50	26	20	20			
48	26	20	20			
46	26	20	20			
44	26	20	20			
42	26	20	20			
40	26	24	25			
38	26	24	25			
36	26	24	25			
34	26	24	25			
32	26	24	25			
30	28	20	30		O ₂	
28	28	30	20		Air	O ₂
26	28	20	30		O ₂	Air
24	28	30	20		Air	O ₂
22	28	20	30		O ₂	Air
20	30	30	30	O ₂	Air	O ₂
18	30	20	30	Air	O ₂	Air
16	30	30	30	O ₂	Air	O ₂
14	30	20	30	Air	O ₂	Air
12	30	30	30	O ₂	Air	O ₂

Table 30

SCHEDULE COMPARISONS 400-FOOT/60-MINUTE (Continued)

Depth (ft)	Time (min)			Breathing Mixture		
Schedule	Schedule			Schedule		
All	Init.	Mod A	Mod B	Init.	Mod A	Mod B
10	30	20	30	Air	O ₂	Air
10	30	40	30	O ₂	Air	O ₂
10	30	20	30	Air	O ₂	Air
10	30	40	30	O ₂	Air	O ₂
10	30	10	30	Air	O ₂	Air
10	20	--	20	O ₂	--	O ₂
10-0	10	10	10	O ₂	O ₂	O ₂

TOTAL ELAPSED TIME:

Initial Schedule	19:33:00
Modification A	17:03:00
Modification B	18:18:00

3.10 450-FOOT/15-MINUTE DIVES

3.10.1 Initial Decompression Schedule

The initial schedule for this dive group is presented in Table 31 and a summary of the dives conducted using this schedule is presented in Table 32.

Table 31

INITIAL SCHEDULE 450-FOOT/15-MINUTE

Depth(ft)	Time(min)	Elapsed Time (hr:min:sec)	Media
0-100	1	00:00:00 - 00:01:00	Air
100-450	4	00:01:00 - 00:05:00	HeO ₂
450	10	00:05:00 - 00:15:00	90/10
450-270	3	00:15:00 - 00:18:00	
270-230	1	00:18:00 - 00:19:00	
230	1	00:19:00 - 00:20:00	
220	1	00:20:00 - 00:21:00	
210	2	00:21:00 - 00:23:00	
200	1	00:23:00 - 00:24:00	
190	2	00:24:00 - 00:26:00	
180	1	00:26:00 - 00:27:00	
170	2	00:27:00 - 00:29:00	
160	1	00:29:00 - 00:30:00	
150	5	00:30:00 - 00:35:00	
140	5	00:35:00 - 00:40:00	
130	5	00:40:00 - 00:45:00	
120	5	00:45:00 - 00:50:00	
110	5	00:50:00 - 00:55:00	
100	5	00:55:00 - 01:00:00	
90	10	01:00:00 - 01:10:00	
80	15	01:10:00 - 01:25:00	
70	15	01:25:00 - 01:40:00	
60	15	01:40:00 - 01:55:00	
50	30	01:55:00 - 02:25:00	
40	40	02:25:00 - 03:05:00	
30	30	03:05:00 - 03:35:00	
30	30	03:35:00 - 04:05:00	
30	30	04:05:00 - 04:35:00	
20	30	04:35:00 - 05:05:00	
20	30	05:05:00 - 05:35:00	

HeO₂
80/20

Air

O₂
Air
O₂
Air
O₂

Table 31

INITIAL SCHEDULE 450-FOOT/15-MINUTE (Continued)

Depth (ft)	Time (min)	Elapsed Time (hr:min:sec)	Media
20	30	05:35:00 - 06:05:00	Air
20	30	06:05:00 - 06:35:00	O ₂
10	30	06:35:00 - 07:05:00	Air
10	30	07:05:00 - 07:35:00	O ₂
10	30	07:35:00 - 08:05:00	Air
10	30	08:05:00 - 08:35:00	O ₂
10	85	08:35:00 - 10:00:00	Air
10-0	10 Sec	10:00:00 - 10:00:10	Air

Times at the decompression stops include the time required for travel to next stop.

Table 32

INITIAL SCHEDULE SUMMARY 450-FOOT/15-MINUTE

Dive No.	Date	Subject	Principal Breathing Mixture	Surface Injection Rate	Time to Bottom	Total Time of Dive	Decompression Sickness
				liters/min	hr:min:sec	hr:min:sec	
1	20 Jun 67	Harter Mesplay	HeO ₂ 90%/10% 80%/20%	35.0 34.0	00:08:15	10:01:20	No

3.10.2 Problems/Modifications

Only one dive was conducted in this group as summarized in Table 32. Harter noted some compression arthralgia. Mesplay did not. Very foul compressor air caused some nausea on the air stops. The dive adhered to the initial schedule except in three instances. The initial schedule prescribes 30 minutes at 50 feet on ascent and 40 minutes at 40 feet. The 50-foot stop was reduced 5 minutes and the 40-foot stop was increased 5 minutes. The initial schedule prescribes 10:00:10 for the total time of dive. The dive took 10:01:20. The increase occurred at the end of the dive in the interval between leaving 10 feet and reaching the surface. The schedule only prescribes 10 seconds for this interval whereas it took 00:01:02 in the dive.

The initial schedule appears, unmodified, as the final schedule for the dive group, as Table A-10 in Appendix A.

3.11 450-FOOT/30-MINUTE DIVES

3.11.1 Initial Decompression Schedule

The initial schedule for this dive group is presented in Table 33 and a summary of the dives conducted using this schedule is presented in Table 34.

Table 33

INITIAL SCHEDULE 450-FOOT/30-MINUTE

Depth(ft)	Time(min)	Elapsed Time (hr:min:sec)	Media
0-75	1	00:00:00 - 00:01:00	Air
75-150	1	00:01:00 - 00:02:00	
150-450	3	00:02:00 - 00:05:00	HeO ₂ 92/08
450	25	00:05:00 - 00:30:00	
450-270	3	00:30:00 - 00:33:00	
270	1	00:33:00 - 00:34:00	
260	1	00:34:00 - 00:35:00	
250	2	00:35:00 - 00:37:00	
240	2	00:37:00 - 00:39:00	
230	2	00:39:00 - 00:41:00	
220	3	00:41:00 - 00:44:00	
210	2	00:44:00 - 00:46:00	
206	2	00:46:00 - 00:48:00	
202	2	00:48:00 - 00:50:00	
198	2	00:50:00 - 00:52:00	HeO ₂ 80/20
194	2	00:52:00 - 00:54:00	
190	2	00:54:00 - 00:56:00	
186	2	00:56:00 - 00:58:00	
182	2	00:58:00 - 01:00:00	
178	2	01:00:00 - 01:02:00	
174	2	01:02:00 - 01:04:00	
170	2	01:04:00 - 01:06:00	
166	2	01:06:00 - 01:08:00	
162	2	01:08:00 - 01:10:00	
158	2	01:10:00 - 01:12:00	
154	2	01:12:00 - 01:14:00	
150	3	01:14:00 - 01:17:00	
146	3	01:17:00 - 01:20:00	
142	3	01:20:00 - 01:23:00	
138	3	01:23:00 - 01:26:00	
134	3	01:26:00 - 01:29:00	

Table 33

INITIAL SCHEDULE 450-FOOT/30-MINUTE (Continued)

Depth (ft)	Time (min)	Elapsed Time (hr:min:sec)	Media
130	2	01:29:00 - 01:31:00	Air ↓
128	2	01:31:00 - 01:33:00	
126	2	01:33:00 - 01:35:00	
124	2	01:35:00 - 01:37:00	
122	2	01:37:00 - 01:39:00	
120	2	01:39:00 - 01:41:00	
118	2	01:41:00 - 01:43:00	
116	2	01:43:00 - 01:45:00	
114	2	01:45:00 - 01:47:00	
112	2	01:47:00 - 01:49:00	
110	2	01:49:00 - 01:51:00	
108	2	01:51:00 - 01:53:00	
106	2	01:53:00 - 01:55:00	
104	2	01:55:00 - 01:57:00	
102	2	01:57:00 - 01:59:00	
100	2	01:59:00 - 02:01:00	
98	2	02:01:00 - 02:03:00	
96	2	02:03:00 - 02:05:00	
94	2	02:05:00 - 02:07:00	
92	2	02:07:00 - 02:09:00	
90	6	02:09:00 - 02:15:00	
88	6	02:15:00 - 02:21:00	
86	6	02:21:00 - 02:27:00	
84	6	02:27:00 - 02:33:00	
82	6	02:33:00 - 02:39:00	
80	6	02:39:00 - 02:45:00	
78	6	02:45:00 - 02:51:00	
76	6	02:51:00 - 02:57:00	
74	6	02:57:00 - 03:03:00	
72	6	03:03:00 - 03:09:00	
70	6	03:09:00 - 03:15:00	
68	6	03:15:00 - 03:21:00	
66	6	03:21:00 - 03:27:00	
64	6	03:27:00 - 03:33:00	
62	6	03:33:00 - 03:39:00	
60	6	03:39:00 - 03:45:00	
58	6	03:45:00 - 03:51:00	
56	6	03:51:00 - 03:57:00	
54	6	03:57:00 - 04:03:00	
52	6	04:03:00 - 04:09:00	

Table 33
INITIAL SCHEDULE 450-FOOT/30-MINUTE (Continued)

Depth (ft)	Time (min)	Elapsed Time (hr:min:sec)	Media
50	18	04:09:00 - 04:27:00	Air
48	18	04:27:00 - 04:45:00	
46	18	04:45:00 - 05:03:00	
44	18	05:03:00 - 05:21:00	
42	18	05:21:00 - 05:39:00	
40	18	05:39:00 - 05:57:00	
38	18	05:57:00 - 06:15:00	
36	18	06:15:00 - 06:33:00	
34	18	06:33:00 - 06:51:00	
32	18	06:51:00 - 07:09:00	↓
30	20	07:09:00 - 07:29:00	02
28	30	07:29:00 - 07:59:00	Air
26	20	07:59:00 - 08:19:00	02
24	30	08:19:00 - 08:49:00	Air
22	20	08:49:00 - 09:09:00	02
20	30	09:09:00 - 09:39:00	Air
18	20	09:39:00 - 09:59:00	02
16	30	09:59:00 - 10:29:00	Air
14	30	10:29:00 - 10:59:00	02
12	30	10:59:00 - 11:29:00	Air
10	30	11:29:00 - 11:59:00	02
10	40	11:59:00 - 12:39:00	Air
10	30	12:39:00 - 13:09:00	02
10	40	13:09:00 - 13:49:00	Air
10	20	13:49:00 - 14:09:00	02
10-0	10	14:09:00 - 14:19:00	02

Times at the decompression stops include the time required for travel to next stop.

Table 34

INITIAL SCHEDULE SUMMARY 450-FOOT/30-MINUTE

Dive No.	Date	Subject	Principal Breathing Mixture	Surface Injection Rate	Time to Bottom	Total Time of Dive	Decompression Sickness
				liters/min	hr:min:sec	hr:min:sec	
1	2 Jun 66	Brown Brauner	HeO ₂ 92%/08% 80%/20%	Not Recorded	00:05:05	14:19:03	No

3.11.2 Problems/Modifications

There were five dives made in this series. This first, Dive 1, was made on the initial schedule. This schedule was then shortened 10 minutes and the next four dives were executed on the shortened schedule, as summarized in Table 35 (Modification A Schedule Summary).

There is only one difference between the two schedules. There is a 30-minute decompression stop at 14 feet in the initial schedule. This stop is decreased to 20 minutes in Modification A Schedule, accounting for the 10-minute decrease in scheduled total time of dive.

Dive 1 was conducted in accordance with the initial schedule without incident.

Dive 2 varied considerably from the Modification A Schedule. Mullen reported that he was "breathing hard" and then "out of breath" after executing a swimming routine on the bottom. Divers therefore, began ascent six minutes 15 seconds early. There were variations of + 1 minute in several of the alternating O₂ and air periods at 10 feet and the final ascent from 10 feet was a minute faster than scheduled. The shortened bottom time and the subsequent variations produced a total time of dive of 14:03:10, five minutes and 50 seconds shorter than scheduled.

Dive 3 was made without incident. Descent took longer than scheduled as a result of holds at 75, 130, 195 and 415 feet. The rest of the dive conformed to schedule.

Both Casse and Lazzaro had ear trouble during descent on Dive 4. Descent time was extended for this reason. Examination of Casse following the dive indicated evidence of acute ear squeeze. The remainder of the dive conformed to schedule except for the final ascent from 10 feet. This took 1 minute 36 seconds longer than scheduled, resulting in a total time of dive of 14:10:36 as compared to the scheduled time of 14:09:00.

Dive 5 progressed as scheduled to the 14-foot depth where Donaldson experienced pain in his right knee. He was successfully recompressed. Wyatt and Wells proceeded to execute the dive as scheduled without incident. The stop at 14 feet was extended slightly because of Donaldson's difficulty. This accounted for the 3-minute increase in the total time of dive for Wyatt and Wells (14:12:00 vice the scheduled 14:09:00).

Modification A Schedule is presented as the final schedule in this dive group as Table A-11 in Appendix A.

Table 35

MODIFICATION A SCHEDULE SUMMARY 450-FOOT/30-MINUTE

Dive No.	Date	Subject	Principal Breathing Mixture	Surface Injection Rate	Time to Bottom	Total Time of Dive	Decompression Sickness
				liters/min	hr:min:sec	hr:min:sec	
2	16 Jun 66	Mullen Parkinson	HeO ₂ 92%/08% 80%/20%	Not Recorded	00:05:12	14:03:10*	No
3	21 Jul 66	Rudin Sundstrom	HeO ₂ 92%/08% 80%/20%	Not Recorded	00:09:09	14:09:30	No
4	4 Oct 66	Reedy Casse Lazzaro	HeO ₂ 92%/08% 80%/20%	Not Recorded	00:08:55	14:10:36	No
5	11 Oct 66	Donaldson Wells Wyatt	HeO ₂ 92%/08% 80%/20%	Not Recorded	00:05:20	14:12:00	Donaldson

* Dive 2 had a short bottom time. Subjects began ascent 6 minutes 15 seconds early

3.12 450-FOOT/60-MINUTE DIVES

3.12.1 Initial Decompression Schedule

The initial decompression schedule for this group is presented in Table 36 and the summary of dives conducted using this schedule is presented in Table 37.

Table 36

INITIAL SCHEDULE 450-FOOT/60-MINUTE

Depth(ft)	Time(min)	Elapsed Time(hr:min:sec)	Media
0-75	1	00:00:00 - 00:01:00	Air HeO ₂ 92/08 ↓
75-150	1	00:01:00 - 00:02:00	
150-250	1	00:02:00 - 00:03:00	
250-350	1	00:03:00 - 00:04:00	
350-450	1	00:04:00 - 00:05:00	
450	55	00:05:00 - 01:00:00	
450-400	1	01:00:00 - 01:01:00	
400-350	1	01:01:00 - 01:02:00	
350-300	1	01:02:00 - 01:03:00	
300	1	01:03:00 - 01:04:00	
290	2	01:04:00 - 01:06:00	
280	2	01:06:00 - 01:08:00	
275	2	01:08:00 - 01:10:00	
270	2	01:10:00 - 01:12:00	
265	2	01:12:00 - 01:14:00	
260	2	01:14:00 - 01:16:00	
255	2	01:16:00 - 01:18:00	
250	2	01:18:00 - 01:20:00	
245	2	01:20:00 - 01:22:00	
240	2	01:22:00 - 01:24:00	
236	2	01:24:00 - 01:26:00	
232	2	01:26:00 - 01:28:00	
228	2	01:28:00 - 01:30:00	
224	2	01:30:00 - 01:32:00	
220	2	01:32:00 - 01:34:00	
218	2	01:34:00 - 01:36:00	
216	2	01:36:00 - 01:38:00	
214	2	01:38:00 - 01:40:00	
212	2	01:40:00 - 01:42:00	

Table 36

INITIAL SCHEDULE 450-FOOT/60-MINUTE (Continued)

Depth (ft)	Time (min)	Elapsed Time (hr:min:sec)	Media
210	2	01:42:00 - 01:44:00	HeO ₂ 92/08
208	2	01:44:00 - 01:46:00	
206	2	01:46:00 - 01:48:00	↓ HeO ₂ 80/20
204	2	01:48:00 - 01:50:00	
202	2	01:50:00 - 01:52:00	↓
200	2	01:52:00 - 01:54:00	
198	2	01:54:00 - 01:56:00	↓
196	2	01:56:00 - 01:58:00	
194	2	01:58:00 - 02:00:00	↓
192	2	02:00:00 - 02:02:00	
190	2	02:02:00 - 02:04:00	↓
188	2	02:04:00 - 02:06:00	
186	2	02:06:00 - 02:08:00	↓
184	2	02:08:00 - 02:10:00	
182	2	02:10:00 - 02:12:00	↓
180	2	02:12:00 - 02:14:00	
178	2	02:14:00 - 02:16:00	↓
176	2	02:16:00 - 02:18:00	
174	2	02:18:00 - 02:20:00	↓
172	2	02:20:00 - 02:22:00	
170	2	02:22:00 - 02:24:00	↓
168	2	02:24:00 - 02:26:00	
166	2	02:26:00 - 02:28:00	↓
164	2	02:28:00 - 02:30:00	
162	2	02:30:00 - 02:32:00	↓
160	2	02:32:00 - 02:34:00	
158	2	02:34:00 - 02:36:00	↓
156	2	02:36:00 - 02:38:00	
154	2	02:38:00 - 02:40:00	↓
152	2	02:40:00 - 02:42:00	
150	2	02:42:00 - 02:44:00	↓
148	2	02:44:00 - 02:46:00	
146	2	02:46:00 - 02:48:00	↓
144	2	02:48:00 - 02:50:00	
142	2	02:50:00 - 02:52:00	↓
140	3	02:52:00 - 02:55:00	
138	3	02:55:00 - 02:58:00	↓
136	3	02:58:00 - 03:01:00	
134	3	03:01:00 - 03:04:00	↓
132	3	03:04:00 - 03:07:00	


Table 36

INITIAL SCHEDULE 450-FOOT/60-MINUTE (Continued)

Depth (ft)	Time (min)	Elapsed Time (hr:min:sec)	Media
130	3	03:07:00 - 03:10:00	Air ↓
128	3	03:10:00 - 03:13:00	
126	3	03:13:00 - 03:16:00	
124	3	03:16:00 - 03:19:00	
122	3	03:19:00 - 03:22:00	
120	4	03:22:00 - 03:26:00	
118	4	03:26:00 - 03:30:00	
116	4	03:30:00 - 03:34:00	
114	4	03:34:00 - 03:38:00	
112	4	03:38:00 - 03:42:00	
110	4	03:42:00 - 03:46:00	
108	4	03:46:00 - 03:50:00	
106	4	03:50:00 - 03:54:00	
104	4	03:54:00 - 03:58:00	
102	4	03:58:00 - 04:02:00	
100	12	04:02:00 - 04:14:00	
98	12	04:14:00 - 04:26:00	
96	12	04:26:00 - 04:38:00	
94	12	04:38:00 - 04:50:00	
92	12	04:50:00 - 05:02:00	
90	12	05:02:00 - 05:14:00	
88	12	05:14:00 - 05:26:00	
86	12	05:26:00 - 05:38:00	
84	12	05:38:00 - 05:50:00	
82	12	05:50:00 - 06:02:00	
80	16	06:02:00 - 06:18:00	
78	16	06:18:00 - 06:34:00	
76	16	06:34:00 - 06:50:00	
74	16	06:50:00 - 07:06:00	
72	16	07:06:00 - 07:22:00	
70	16	07:22:00 - 07:38:00	
68	16	07:38:00 - 07:54:00	
66	16	07:54:00 - 08:10:00	
64	16	08:10:00 - 08:26:00	
62	16	08:26:00 - 08:42:00	
60	20	08:42:00 - 09:02:00	
58	20	09:02:00 - 09:22:00	
56	20	09:22:00 - 09:42:00	
54	20	09:42:00 - 10:02:00	

Table 36

INITIAL SCHEDULE 450-FOOT/60-MINUTE (Continued)

Depth (ft)	Time (min)	Elapsed Time (hr:min:sec)	Media
52	20	10:02:00 - 10:22:00	Air
50	20	10:22:00 - 10:42:00	
48	20	10:42:00 - 11:02:00	
46	20	11:02:00 - 11:22:00	
44	20	11:22:00 - 11:42:00	
42	20	11:42:00 - 12:02:00	
40	22	12:02:00 - 12:24:00	
38	22	12:24:00 - 12:46:00	
36	22	12:46:00 - 13:08:00	
34	22	13:08:00 - 13:30:00	
32	22	13:30:00 - 13:52:00	
30	30	13:52:00 - 14:22:00	
28	20	14:22:00 - 14:42:00	
26	30	14:42:00 - 15:12:00	
24	20	15:12:00 - 15:32:00	
22	30	15:32:00 - 16:02:00	02
20	30	16:02:00 - 16:32:00	Air
18	30	16:32:00 - 17:02:00	02
16	30	17:02:00 - 17:32:00	Air
14	30	17:32:00 - 18:02:00	02
12	30	18:02:00 - 18:32:00	Air
10	30	18:32:00 - 19:02:00	02
10	30	19:02:00 - 19:32:00	Air
10	30	19:32:00 - 20:02:00	02
10	30	20:02:00 - 20:32:00	Air
10	30	20:32:00 - 21:02:00	02
10	20	21:02:00 - 21:22:00	Air
10-0	10	21:22:00 - 21:32:00	02

Times at the decompression stops include the time required for travel to next stop.

Table 37

INITIAL SCHEDULE SUMMARY 450-FOOT/60-MINUTE

Dive No.	Date	Subject	Principal Breathing Mixture	Surface Injection Rate	Time to Bottom	Total Time of Dive	Decompression Sickness
				liters/min	hr:min:sec	hr:min:sec	
1	23 Jun 66	Wyatt Blackburn	HeO ₂ 92%/08% 80%/20%	Not Recorded	00:05:40	21:32:20	No
2	30 Jun 66	Kennedy Coffman	HeO ₂ 92%/08% 80%/20%	Not Recorded	00:06:00	21:33:34	No
3	13 Oct 66	Casse Parkinson Reedy	HeO ₂ 92%/08% 80%/20%	Not Recorded	00:05:30	21:34:10	Casse (possible)
4	20 Oct 66	Wells Stubbs Mesplay	HeO ₂ 92%/08% 80%/20%	Not Recorded	00:05:08	21:32:00	

3.12.2 Problems/Modifications

All four dives were executed as scheduled with no significant deviations. There were some minor deviations in rates of travel. Dives 1, 2 and 3 descended to bottom at 75 FPM, arriving between 30 and 60 seconds later than scheduled. On ascent, the rates of travel on Dives 1, 2 and 3 varied slightly in the interval between 300 feet and 208 feet. The minor increases in the total times of dive for Dives 1, 2 and 3 as compared to the scheduled time of 21:32:00 resulted from slow ascents in the final interval between 10 feet and the surface.

Casse experienced dizziness and nausea during Dive 3 beginning at the 98-foot depth at elapsed time 04:22:30. He was attended by a medical officer in the chamber. He completed the dive as scheduled. Symptoms persisted throughout the remainder of the dive although he felt slightly better. He was still experiencing dizziness during post-dive medical examination; nausea. Results of exam were normal. No after effects were recorded.

The initial schedule, unmodified, is presented as the final schedule in this dive group as Table A-12 in Appendix A.

3.13 500-FOOT/30-MINUTE DIVES

3.13.1 Initial Decompression Schedule

The initial decompression schedule for this dive group is presented in Table 38 and the summary of the dives conducted using this schedule is presented in Table 39.

Table 38
INITIAL SCHEDULE 500-FOOT/30-MINUTE


Depth (ft)	Time (min)	Elapsed Time (hr:min:sec)	Media
0-100	1.33	00:00:00 - 00:01:20	Air
100-500	5.33	00:01:20 - 00:06:40	HeO ₂
500	23.33	00:06:40 - 00:30:00	92/8
500-290	4	00:30:00 - 00:34:00	
290	2	00:34:00 - 00:36:00	
280	2	00:36:00 - 00:38:00	
270	2	00:38:00 - 00:40:00	
260	2	00:40:00 - 00:42:00	
250	2	00:42:00 - 00:44:00	
245	2	00:44:00 - 00:46:00	
240	2	00:46:00 - 00:48:00	
235	2	00:48:00 - 00:50:00	
230	2	00:50:00 - 00:52:00	
225	2	00:52:00 - 00:54:00	
220	2	00:54:00 - 00:56:00	
215	2	00:56:00 - 00:58:00	
210	2	00:58:00 - 01:00:00	
205	2	01:00:00 - 01:02:00	
200	2	01:02:00 - 01:04:00	
195	2	01:04:00 - 01:06:00	
190	2	01:06:00 - 01:08:00	
186	2	01:08:00 - 01:10:00	
182	2	01:10:00 - 01:12:00	
178	2	01:12:00 - 01:14:00	
174	2	01:14:00 - 01:16:00	
170	2	01:16:00 - 01:18:00	
168	2	01:18:00 - 01:20:00	
166	2	01:20:00 - 01:22:00	
164	2	01:22:00 - 01:24:00	
162	2	01:24:00 - 01:26:00	
160	2	01:26:00 - 01:28:00	

Table 38

INITIAL SCHEDULE 500-FOOT/30-MINUTE (Continued)

Depth (ft)	Time (min)	Elapsed Time (hr:min:sec)	Media
158	2	01:28:00 - 01:30:00	HeO ₂ 80/20 ↓
156	2	01:30:00 - 01:32:00	
154	2	01:32:00 - 01:34:00	
152	2	01:34:00 - 01:36:00	
150	2	01:36:00 - 01:38:00	
148	2	01:38:00 - 01:40:00	
146	2	01:40:00 - 01:42:00	
144	2	01:42:00 - 01:44:00	
142	2	01:44:00 - 01:46:00	
140	2	01:46:00 - 01:48:00	
138	2	01:48:00 - 01:50:00	
136	2	01:50:00 - 01:52:00	
134	2	01:52:00 - 01:54:00	
132	2	01:54:00 - 01:56:00	
130	2	01:56:00 - 01:58:00	
128	2	01:58:00 - 02:00:00	Air ↓
126	2	02:00:00 - 02:02:00	
124	2	02:02:00 - 02:04:00	
122	2	02:04:00 - 02:06:00	
120	2	02:06:00 - 02:08:00	
118	2	02:08:00 - 02:10:00	
116	2	02:10:00 - 02:12:00	
114	2	02:12:00 - 02:14:00	
112	2	02:14:00 - 02:16:00	
110	4	02:16:00 - 02:20:00	
108	4	02:20:00 - 02:24:00	
106	4	02:24:00 - 02:28:00	
104	4	02:28:00 - 02:32:00	
102	4	02:32:00 - 02:36:00	
100	4	02:36:00 - 02:40:00	
98	4	02:40:00 - 02:44:00	
96	4	02:44:00 - 02:48:00	
94	4	02:48:00 - 02:52:00	
92	4	02:52:00 - 02:56:00	
90	5	02:56:00 - 03:01:00	
88	5	03:01:00 - 03:06:00	
86	5	03:06:00 - 03:11:00	
84	5	03:11:00 - 03:16:00	
82	5	03:16:00 - 03:21:00	
80	5	03:21:00 - 03:26:00	

Table 38

INITIAL SCHEDULE 500-FOOT/30-MINUTE (Continued)

Depth (ft)	Time (min)	Elapsed Time (hr:min:sec)	Media
78	5	03:26:00 - 03:31:00	Air ↓
76	5	03:31:00 - 03:36:00	
74	5	03:36:00 - 03:41:00	
72	5	03:41:00 - 03:46:00	
70	13	03:46:00 - 03:59:00	
68	13	03:59:00 - 04:12:00	
66	13	04:12:00 - 04:25:00	
64	13	04:25:00 - 04:38:00	
62	13	04:38:00 - 04:51:00	
60	13	04:51:00 - 05:04:00	
58	13	05:04:00 - 05:17:00	
56	13	05:17:00 - 05:30:00	
54	13	05:30:00 - 05:43:00	
52	13	05:43:00 - 05:56:00	
50	18	05:56:00 - 06:14:00	
48	18	06:14:00 - 06:32:00	
46	18	06:32:00 - 06:50:00	
44	18	06:50:00 - 07:08:00	
42	18	07:08:00 - 07:26:00	
40	18	07:26:00 - 07:44:00	
38	18	07:44:00 - 08:02:00	
36	18	08:02:00 - 08:20:00	
34	18	08:20:00 - 08:38:00	
32	18	08:38:00 - 08:56:00	
30	30	08:56:00 - 09:26:00	
28	20	09:26:00 - 09:46:00	02
26	30	09:46:00 - 10:16:00	Air
24	20	10:16:00 - 10:36:00	02
22	30	10:36:00 - 11:06:00	Air
20	30	11:06:00 - 11:36:00	02
18	30	11:36:00 - 12:06:00	Air
16	30	12:06:00 - 12:36:00	02
14	30	12:36:00 - 13:06:00	Air
12	30	13:06:00 - 13:36:00	02
10	30	13:36:00 - 14:06:00	Air
10	30	14:06:00 - 14:36:00	02
10	30	14:36:00 - 15:06:00	Air
10	30	15:06:00 - 15:36:00	02
10	30	15:36:00 - 16:06:00	Air
10	20	16:06:00 - 16:26:00	02
10-0	10	16:26:00 - 16:36:00	02

Times at the decompression stops include the time required for travel to next stop.

Table 39

INITIAL SCHEDULE SUMMARY 500-FOOT/30-MINUTE

Dive No.	Date	Subject	Principal Breathing Mixture	Surface Injection Rate	Time to Bottom	Total Time of Dive	Decompression Sickness
				liters/min	hr:min:sec	hr:min:sec	
1	4 Aug 66	Wallace Hendry	HeO ₂ 92%/08% 80%/20%	38.5 25.0	00:06:10	16:36:00	No

3.13.2 Problems/Modifications

Only one dive was made in this group. The dive adhered to schedule except for two minor deviations. Descent was 30 seconds faster than scheduled. The shift to 80%-20% HeO₂ at 205 feet was made one minute late. No problems were encountered during the dive.

The initial schedule, unmodified, is presented as the final schedule for this dive group as Table A-13 in Appendix A.

Section 4

DISCUSSION OF RESULTS

In this section, pertinent aspects of the dives are discussed. Table 40 presents an overall summary of the dives conducted.

Table 40

SUMMARY OF DIVE GROUPS

Dive Group Depth/Time	Dives Conducted	Man-Dives	Schedules	Cases of Decom- pression Sickness
300-foot/15-minute	8	16	1	0
300-foot/30-minute	10	20	3	2
300-foot/60-minute	3	6	2	0
350-foot/15-minute	2	4	1	0
350-foot/30-minute	2	4	1	0
350-foot/60-minute	3	6	3	2
400-foot/15-minute	4	8	2	3
400-foot/30-minute	4	8	1	0
400-foot/60-minute	7	16	3	3
450-foot/15-minute	1	2	1	0
450-foot/30-minute	5	12	2	2
450-foot/60-minute	4	10	1	1 (poss)
500-foot/30-minute	1	2	1	0
Totals				
13 Dive Groups	54	114	22	13

4.1 DECOMPRESSION EXPERIENCE

There were 13 occurrences of decompression sickness reported. The breakdown for each dive group is as follows.

300-foot/30-minute	2
350-foot/60-minute	2
400-foot/15-minute	3
400-foot/60-minute	3
450-foot/30-minute	2
450-foot/60-minute	1 (possible)

Of the 44 divers involved in these dives, 10 divers suffered decompression sickness. Three divers experienced decompression sickness twice. Each of the other seven divers encountered it once. The 13 cases of decompression sickness were distributed among divers as follows:

Brauner	1	Lazaro	1
Casse	1(possible)	Meeks	1
Donaldson	2	Mullen	2
Garrahan	2	Pratt	1
Jones	1	Rudin	1

Appendix C presents the summaries by dive group and by diver of the decompression sickness encountered.

4.2 ACTUAL VS TEST CONDITIONS

The differences between the test conditions and conditions at sea should be fully realized. For the experimental dives, the test chamber was pressurized on air, causing the divers to stop at around 100 feet during descent to put on the diving rig. At sea, the diving bell would be pressurized on the HeO₂ mixture, allowing the divers to descend straight to the bottom.

Decompression for the experimental dives was also accomplished with the chamber pressurized on air. At the stipulated depth, the divers stopped breathing the HeO₂ mixture from the diving rig and breathed the chamber air, getting oxygen, when required, from a mask. At sea, the air decompression would be accomplished in a deck decompression chamber. The time at which the divers are scheduled to breathe air, however, does not change from the experimental situation. Therefore, the diving bell, which was pressurized on HeO₂, must be brought up to permit the divers to transfer to the deck decompression chamber at precisely the right time. The remainder of the dive is basically the same for both actual and experimental situations.

4.3 STATUS OF FINAL DECOMPRESSION SCHEDULES

The final decompression schedules found in Appendix A are the most successful of those tested for each dive group. In those instances where only one schedule was tested in a dive group, that schedule is included in Appendix A as the final schedule in the group.

The final schedules are published for information of all interested activities and individuals. At the time of publication of this report, these schedules have not been evaluated in the open sea and have not been promulgated by the Navy for routine diving operations.

APPENDIX A

FINAL DECOMPRESSION SCHEDULES

		Page
Table A-1	FINAL SCHEDULE - 300-FOOT/15-MINUTE ...	70
Table A-2	FINAL SCHEDULE - 300-FOOT/30-MINUTE ...	71
Table A-3	FINAL SCHEDULE - 300-FOOT/60-MINUTE ...	72
Table A-4	FINAL SCHEDULE - 350-FOOT/15-MINUTE ...	75
Table A-5	FINAL SCHEDULE - 350-FOOT/30-MINUTE ...	76
Table A-6	FINAL SCHEDULE - 350-FOOT/60-MINUTE ...	79
Table A-7	FINAL SCHEDULE - 400-FOOT/15-MINUTE ...	83
Table A-8	FINAL SCHEDULE - 400-FOOT/30-MINUTE ...	85
Table A-9	FINAL SCHEDULE - 400-FOOT/60-MINUTE ...	88
Table A-10	FINAL SCHEDULE - 450-FOOT/15-MINUTE ...	91
Table A-11	FINAL SCHEDULE - 450-FOOT/30-MINUTE ...	93
Table A-12	FINAL SCHEDULE - 450-FOOT/60-MINUTE ...	97
Table A-13	FINAL SCHEDULE - 500-FOOT/30-MINUTE ...	102

Table A-1

FINAL SCHEDULE - 300-FOOT/15-MINUTE

Depth (ft)	Time (min)	Elapsed Time (hr:min:sec)	Media
0-100	1	00:00:00 - 00:01:00	Air
100	0.5	00:01:00 - 00:01:30	HeO ₂ 80/20
100-300	2	00:01:30 - 00:03:30	<div style="text-align: center;"> ↓ Air ↓ </div>
300	11.5	00:03:30 - 00:15:00	
300-120	3	00:15:00 - 00:18:00	
120	1	00:18:00 - 00:19:00	
110	2	00:19:00 - 00:21:00	
100	2	00:21:00 - 00:23:00	
90	2	00:23:00 - 00:25:00	
80	5	00:25:00 - 00:30:00	
70	5	00:30:00 - 00:35:00	
60	5	00:35:00 - 00:40:00	
50	5	00:40:00 - 00:45:00	
46	15	00:45:00 - 01:00:00	O ₂
30	15	01:00:00 - 01:15:00	Air
20	25	01:15:00 - 01:40:00	O ₂
10	25	01:40:00 - 02:05:00	Air
10-0	10	02:05:00 - 02:15:00	O ₂

Times at the decompression stops include the time required for travel to next stop.

Bends-free Man-Dives: 16
Decompression Sickness: 0

Table A-2

FINAL SCHEDULE - 300 FOOT/30-MINUTE

Depth (ft)	Time (min)	Elapsed Time (hr:min:sec)	Media
0-75	1	00:00:00 - 00:01:00	Air
75	0.5	00:01:00 - 00:01:30	↓
75-300	3	00:01:30 - 00:04:30	HeO ₂
300	25.5	00:04:30 - 00:30:00	85/15
			↓
300-180	2	00:30:00 - 00:32:00	
180-150	1	00:32:00 - 00:33:00	
150	1	00:33:00 - 00:34:00	HeO ₂
140	2	00:34:00 - 00:36:00	80/20
			↓
130	5	00:36:00 - 00:41:00	
120	5	00:41:00 - 00:46:00	
110	5	00:46:00 - 00:51:00	
100	5	00:51:00 - 00:56:00	Air
90	5	00:56:00 - 01:01:00	↓
80	15	01:01:00 - 01:16:00	
70	15	01:16:00 - 01:31:00	
60	15	01:31:00 - 01:46:00	
50	20	01:46:00 - 02:06:00	↓
40	30	02:06:00 - 02:36:00	O ₂
30	30	02:36:00 - 03:06:00	Air
30	30	03:06:00 - 03:36:00	O ₂
20	30	03:36:00 - 04:06:00	Air
20	30	04:06:00 - 04:36:00	O ₂
			↓
10	30	04:36:00 - 05:06:00	Air
10	30	05:06:00 - 05:36:00	O ₂
10	30	05:36:00 - 06:06:00	Air
10	20	06:06:00 - 06:26:00	O ₂
10-0	10	06:26:00 - 06:36:00	O ₂

Times at the decompression stops include the time required for travel to next stop.

Bends-free Man-Dives: 10
Decompression Sickness: 0

Table A-3

FINAL SCHEDULE - 300-FOOT/60-MINUTE

Depth (ft)	Time (min)	Elapsed Time (hr:min:sec)	Media
0-120	2	00:00:00 - 00:02:00	Air
120	0.5	00:02:00 - 00:02:30	↓
120-300	3	00:02:30 - 00:05:30	HeO ₂
300	54.5	00:05:30 - 01:00:00	85/15
			↓
300-180	2	01:00:00 - 01:02:00	HeO ₂
180-160	1	01:02:00 - 01:03:00	↓
			80/20
160	2	01:03:00 - 01:05:00	↓
156	2	01:05:00 - 01:07:00	↓
152	2	01:07:00 - 01:09:00	↓
148	2	01:09:00 - 01:11:00	↓
144	2	01:11:00 - 01:13:00	↓
140	2	01:13:00 - 01:15:00	↓
136	2	01:15:00 - 01:17:00	↓
			↓
132	2	01:17:00 - 01:19:00	↓
128	2	01:19:00 - 01:21:00	↓
124	2	01:21:00 - 01:23:00	↓
120	2	01:23:00 - 01:25:00	↓
116	2	01:25:00 - 01:27:00	↓
112	2	01:27:00 - 01:29:00	↓
108	2	01:29:00 - 01:31:00	↓
104	2	01:31:00 - 01:33:00	Air
			↓
100	4	01:33:00 - 01:37:00	↓
96	4	01:37:00 - 01:41:00	↓
92	4	01:41:00 - 01:45:00	↓
88	4	01:45:00 - 01:49:00	↓
84	4	01:49:00 - 01:53:00	↓

Table A-3

FINAL SCHEDULE - 300-FOOT/60-MINUTE (Continued)

Depth (ft)	Time (min)	Elapsed Time (hr:min:sec)	Media
80	4	01:53:00 - 01:57:00	Air
76	4	01:57:00 - 02:01:00	
72	4	02:01:00 - 02:05:00	
68	4	02:05:00 - 02:09:00	
64	4	02:09:00 - 02:13:00	
60	8	02:13:00 - 02:21:00	↓ Air ↓ O ₂ ↓ Air ↓ O ₂ ↓ Air ↓ O ₂ ↓
58	8	02:21:00 - 02:29:00	
56	8	02:29:00 - 02:37:00	
54	8	02:37:00 - 02:45:00	
52	8	02:45:00 - 02:53:00	
50	8	02:53:00 - 03:01:00	
48	8	03:01:00 - 03:09:00	
46	8	03:09:00 - 03:17:00	
44	8	03:17:00 - 03:25:00	
42	8	03:25:00 - 03:33:00	
40	8	03:33:00 - 03:41:00	
38	8	03:41:00 - 03:49:00	
36	8	03:49:00 - 03:57:00	
34	8	03:57:00 - 04:05:00	
32	8	04:05:00 - 04:13:00	
30	15	04:13:00 - 04:28:00	O ₂
28	15	04:28:00 - 04:43:00	↓ Air
26	15	04:43:00 - 04:58:00	↓ O ₂
24	15	04:58:00 - 05:13:00	↓ Air
22	15	05:13:00 - 05:28:00	↓ O ₂
20	15	05:28:00 - 05:43:00	↓ Air
18	15	05:43:00 - 05:58:00	↓ O ₂
16	15	05:58:00 - 06:13:00	↓
14	15	06:13:00 - 06:28:00	
12	15	06:28:00 - 06:43:00	

Table A-3

FINAL SCHEDULE - 300-FOOT/60-MINUTE (Continued)

Depth (ft)	Time (min)	Elapsed Time (hr:min:sec)	Media
10	30	06:43:00 - 07:13:00	Air
10	30	07:13:00 - 07:43:00	O ₂
10	30	07:43:00 - 08:13:00	Air
10	20	08:13:00 - 08:33:00	O ₂
10-0	10	08:33:00 - 08:43:00	O ₂

Times at the decompression stops include the time required for travel to next stop.

Bends-free Man-Dives: 2
Decompression Sickness: 0

Table A-4

FINAL SCHEDULE - 350-FOOT/15-MINUTE

Depth (ft)	Time (min)	Elapsed Time (hr:min:sec)	Media
0-75	1	00:00:00 - 00:01:00	Air HeO ₂ 85/15 ↓
75	0.5	00:01:00 - 00:01:30	
75-350	5	00:01:30 - 00:06:30	
350	8.5	00:06:30 - 00:15:00	
350-170	3	00:15:00 - 00:18:00	↓ Air ↓
170-140	1	00:18:00 - 00:19:00	
140	2	00:19:00 - 00:21:00	
130	2	00:21:00 - 00:23:00	
120	2	00:23:00 - 00:25:00	
110	2	00:25:00 - 00:27:00	
100	2	00:27:00 - 00:29:00	
90	5	00:29:00 - 00:34:00	↓
80	5	00:34:00 - 00:39:00	
70	10	00:39:00 - 00:49:00	
60	10	00:49:00 - 00:59:00	
50	10	00:59:00 - 01:09:00	↓ O ₂ Air O ₂ ↓
40	15	01:09:00 - 01:24:00	
30	25	01:24:00 - 01:49:00	
20	25	01:49:00 - 02:14:00	
10	25	02:14:00 - 02:39:00	Air O ₂ O ₂
10	20	02:39:00 - 02:59:00	
10-0	10	02:59:00 - 03:09:00	

Times at the decompression stops include the time required for travel to next stop.

Bends-free Man-Dives: 4
Decompression Sickness: 0

Table A-5

FINAL SCHEDULE - 350-FOOT/30-MINUTE

Depth (ft)	Time (min)	Elapsed Time (hr:min:sec)	Media
0-50	1	00:00:00 - 00:01:00	Air
50-125	1	00:01:00 - 00:02:00	↓
125-200	1	00:02:00 - 00:03:00	HeO ₂
200-275	1	00:03:00 - 00:04:00	87/13
275-350	1	00:04:00 - 00:05:00	↓
350	25	00:05:00 - 00:30:00	
350-290	1	00:30:00 - 00:31:00	
290-230	1	00:31:00 - 00:32:00	
230-180	1	00:32:00 - 00:33:00	↓
180	1	00:33:00 - 00:34:00	HeO ₂
175	1	00:34:00 - 00:35:00	80/20
170	1	00:35:00 - 00:36:00	↓
165	1	00:36:00 - 00:37:00	
160	1	00:37:00 - 00:38:00	
155	1	00:38:00 - 00:39:00	
150	2	00:39:00 - 00:41:00	
145	2	00:41:00 - 00:43:00	
140	2	00:43:00 - 00:45:00	
135	2	00:45:00 - 00:47:00	
130	2	00:47:00 - 00:49:00	
125	2	00:49:00 - 00:51:00	
120	2	00:51:00 - 00:53:00	
115	2	00:53:00 - 00:55:00	↓
110	5	00:55:00 - 01:00:00	Air

Table A-5

FINAL SCHEDULE - 350-FOOT/30-MINUTE (Continued)

Depth (ft)	Time (min)	Elapsed Time (hr:min:sec)	Media
106	5	01:00:00 - 01:05:00	Air
102	5	01:05:00 - 01:10:00	
98	5	01:10:00 - 01:15:00	
94	5	01:15:00 - 01:20:00	
90	5	01:20:00 - 01:25:00	
86	5	01:25:00 - 01:30:00	
82	5	01:30:00 - 01:35:00	
78	5	01:35:00 - 01:40:00	
74	5	01:40:00 - 01:45:00	
70	5	01:45:00 - 01:50:00	
68	5	01:50:00 - 01:55:00	
66	5	01:55:00 - 02:00:00	
64	5	02:00:00 - 02:05:00	
62	5	02:05:00 - 02:10:00	
60	5	02:10:00 - 02:15:00	
58	5	02:15:00 - 02:20:00	
56	5	02:20:00 - 02:25:00	
54	5	02:25:00 - 02:30:00	
52	5	02:30:00 - 02:35:00	
50	5	02:35:00 - 02:40:00	
48	5	02:40:00 - 02:45:00	
46	5	02:45:00 - 02:50:00	
44	5	02:50:00 - 02:55:00	
42	5	02:55:00 - 03:00:00	
40	8	03:00:00 - 03:08:00	Air
38	8	03:08:00 - 03:16:00	
36	8	03:16:00 - 03:24:00	
34	8	03:24:00 - 03:32:00	
32	8	03:32:00 - 03:40:00	
30	16	03:40:00 - 03:56:00	
28	16	03:56:00 - 04:12:00	
26	16	04:12:00 - 04:28:00	
24	16	04:28:00 - 04:44:00	
22	16	04:44:00 - 05:00:00	

Table A-5

FINAL SCHEDULE - 350-FOOT/30-MINUTE (Continued)

Depth (ft)	Time (min)	Elapsed Time (hr:min:sec)	Media
20	18	05:00:00 - 05:18:00	02
18	18	05:18:00 - 05:36:00	↓
16	18	05:36:00 - 05:54:00	Air
14	18	05:54:00 - 06:12:00	↓
12	18	06:12:00 - 06:30:00	02
10	18	06:30:00 - 06:48:00	↓
10	30	06:48:00 - 07:18:00	Air
10	30	07:18:00 - 07:48:00	02
10	30	07:48:00 - 08:18:00	Air
10	30	08:18:00 - 08:48:00	02
10	30	08:48:00 - 09:18:00	Air
10	20	09:18:00 - 09:38:00	02
10-0	10	09:38:00 - 09:48:00	02

Times at the decompression stops include the time required for travel to next stop.

Bends-free Man-Dives: 4
Decompression Sickness: 0

Table A-6

FINAL SCHEDULE - 350-FOOT/60-MINUTE

Depth (ft)	Time (min)	Elapsed Time (hr.min:sec)	Media
0-125	1.67	00:00:00 - 00:01:40	Air HeO ₂ 87/13 ↓
125	0.5	00:01:40 - 00:02:10	
125-350	3	00:02:10 - 00:05:10	
350	54.83	00:05:10 - 01:00:00	
350-250	2	01:00:00 - 01:02:00	HeO ₂ 80/20 ↓
250-200	1	01:02:00 - 01:03:00	
200	1	01:03:00 - 01:04:00	↓
195	1	01:04:00 - 01:05:00	
190	1	01:05:00 - 01:06:00	
185	1	01:06:00 - 01:07:00	
180	1	01:07:00 - 01:08:00	
175	1	01:08:00 - 01:09:00	
170	1	01:09:00 - 01:10:00	
165	1	01:10:00 - 01:11:00	
160	2	01:11:00 - 01:13:00	
156	2	01:13:00 - 01:15:00	
152	2	01:15:00 - 01:17:00	
148	2	01:17:00 - 01:19:00	
144	2	01:19:00 - 01:21:00	
140	2	01:21:00 - 01:23:00	
136	2	01:23:00 - 01:25:00	
132	2	01:25:00 - 01:27:00	
130	2	01:27:00 - 01:29:00	
128	2	01:29:00 - 01:31:00	
126	2	01:31:00 - 01:33:00	
124	2	01:33:00 - 01:35:00	

Table A-6

FINAL SCHEDULE - 350-FOOT/60-MINUTE (Continued)

Depth (ft)	Time (min)	Elapsed Time (hr:min:sec)	Media
122	2	01:35:00 - 01:37:00	HeO ₂ 80/20 ↓
120	2	01:37:00 - 01:39:00	
118	2	01:39:00 - 01:41:00	
116	2	01:41:00 - 01:43:00	
114	2	01:43:00 - 01:45:00	
112	2	01:45:00 - 01:47:00	
110	2	01:47:00 - 01:49:00	
108	2	01:49:00 - 01:51:00	
106	2	01:51:00 - 01:53:00	
104	2	01:53:00 - 01:55:00	
102	2	01:55:00 - 01:57:00	
100	3	01:57:00 - 02:00:00	Air ↓
98	3	02:00:00 - 02:03:00	
96	3	02:03:00 - 02:06:00	
94	3	02:06:00 - 02:09:00	
92	3	02:09:00 - 02:12:00	
90	3	02:12:00 - 02:15:00	
88	3	02:15:00 - 02:18:00	
86	3	02:18:00 - 02:21:00	
84	3	02:21:00 - 02:24:00	
82	3	02:24:00 - 02:27:00	
80	3	02:27:00 - 02:30:00	
78	3	02:30:00 - 02:33:00	
76	3	02:33:00 - 02:36:00	
74	3	02:36:00 - 02:39:00	
72	3	02:39:00 - 02:42:00	

Table A-6

FINAL SCHEDULE - 350-FOOT/60-MINUTE (Continued)

Depth (ft)	Time (min)	Elapsed Time (hr:min:sec)	Media
70	10	02:42:00 - 02:52:00	Air ↓
68	10	02:52:00 - 03:02:00	
66	10	03:02:00 - 03:12:00	
64	10	03:12:00 - 03:22:00	
62	10	03:22:00 - 03:32:00	
60	10	03:32:00 - 03:42:00	
58	10	03:42:00 - 03:52:00	
56	10	03:52:00 - 04:02:00	
54	10	04:02:00 - 04:12:00	
52	10	04:12:00 - 04:22:00	
50	10	04:22:00 - 04:32:00	
48	10	04:32:00 - 04:42:00	
46	10	04:42:00 - 04:52:00	
44	10	04:52:00 - 05:02:00	
42	10	05:02:00 - 05:12:00	
40	21	05:12:00 - 05:33:00	
38	21	05:33:00 - 05:54:00	
36	21	05:54:00 - 06:15:00	
34	21	06:15:00 - 06:36:00	
32	21	06:36:00 - 06:57:00	
30	21	06:57:00 - 07:18:00	
28	21	07:18:00 - 07:39:00	
26	21	07:39:00 - 08:00:00	
24	21	08:00:00 - 08:21:00	
22	21	08:21:00 - 08:42:00	
20	30	08:42:00 - 09:12:00	O ₂
18	30	09:12:00 - 09:42:00	Air
16	30	09:42:00 - 10:12:00	O ₂
14	30	10:12:00 - 10:42:00	Air
12	30	10:42:00 - 11:12:00	O ₂

Table A-6

FINAL SCHEDULE - 350-FOOT/60-MINUTE (Continued)

Depth (ft)	Time (min)	Elapsed Time (hr:min:sec)	Media
10	30	11:12:00 - 11:42:00	Air
10	30	11:42:00 - 12:12:00	O ₂
10	30	12:12:00 - 12:42:00	Air
10	30	12:42:00 - 13:12:00	O ₂
10	30	13:12:00 - 13:42:00	Air
10	20	13:42:00 - 14:02:00	O ₂
10-0	10	14:02:00 - 14:12:00	O ₂

Times at the decompression stops include the time required for travel to next stop.

Bends-free Man-Dives: 1
 Decompression Sickness: 1
 Divers Accompanying Treatment: 0

Table A-7

FINAL SCHEDULE -400-FOOT/15-MINUTE

Depth (ft)	Time (min)	Elapsed Time (hr:min:sec)	Media
0-100	1	00:00:00 - 00:01:00	Air
100	0.5	00:01:00 - 00:01:30	HeO ₂
100-400	4	00:01:30 - 00:05:30	90/10
400	9.5	00:05:30 - 00:15:00	↓
400-220	3	00:15:00 - 00:18:00	
220-200	1	00:18:00 - 00:19:00	↓
200	1	00:19:00 - 00:20:00	HeO ₂
190	1	00:20:00 - 00:21:00	80/20
180	1	00:21:00 - 00:22:00	↓
170	2	00:22:00 - 00:24:00	
160	1	00:24:00 - 00:25:00	
150	2	00:25:00 - 00:27:00	
140	2	00:27:00 - 00:29:00	
130	2	00:29:00 - 00:31:00	
120	5	00:31:00 - 00:36:00	
110	5	00:36:00 - 00:41:00	
100	5	00:41:00 - 00:46:00	Air
90	5	00:46:00 - 00:51:00	↓
80	15	00:51:00 - 01:06:00	
70	10	01:06:00 - 01:16:00	
60	15	01:16:00 - 01:31:00	
50	15	01:31:00 - 01:46:00	
40	35	01:46:00 - 02:21:00	
30	30	02:21:00 - 02:51:00	O ₂
30	15	02:51:00 - 03:06:00	Air

Table A-7

FINAL SCHEDULE - 400-FOOT/15-MINUTE (Continued)

Depth (ft)	Time (min)	Elapsed Time (hr:min:sec)	Media
20	15	03:06:00 - 03:21:00	Air
20	30	03:21:00 - 03:51:00	O ₂
20	30	03:51:00 - 04:21:00	Air
20	30	04:21:00 - 04:51:00	O ₂
10	30	04:51:00 - 05:21:00	Air
10	30	05:21:00 - 05:51:00	O ₂
10	30	05:51:00 - 06:21:00	Air
10	30	06:21:00 - 06:51:00	O ₂
10	30	06:51:00 - 07:21:00	Air
10	30	07:21:00 - 07:51:00	O ₂
10-0	10 Sec	07:51:00 - 07:51:10	O ₂

Times at the decompression stops include the time required for travel to next stop.

Bends-free Man-Dives: 4
 Decompression Sickness: 1
 Divers Accompanying Treatment: 0

Table A-8

FINAL SCHEDULE - 400-FOOT/30-MINUTE

Depth (ft)	Time (min)	Elapsed Time (hr:min:sec)	Media
0-100	2	00:00:00 - 00:02:00	Air HeO ₂ 90/10
100	0.5	00:02:00 - 00:02:30	
100-400	3	00:02:30 - 00:05:30	
400	24.5	00:05:30 - 00:30:00	
400-340	1	00:30:00 - 00:31:00	HeO ₂ 80/20
340-280	1	00:31:00 - 00:32:00	
280-220	1	00:32:00 - 00:33:00	
220	1	00:33:00 - 00:34:00	
215	1	00:34:00 - 00:35:00	
210	1	00:35:00 - 00:36:00	
205	1	00:36:00 - 00:37:00	
200	1	00:37:00 - 00:38:00	
195	1	00:38:00 - 00:39:00	
190	1	00:39:00 - 00:40:00	
185	1	00:40:00 - 00:41:00	
180	2	00:41:00 - 00:43:00	HeO ₂ 80/20
175	2	00:43:00 - 00:45:00	
170	2	00:45:00 - 00:47:00	
165	2	00:47:00 - 00:49:00	
160	2	00:49:00 - 00:51:00	
155	2	00:51:00 - 00:53:00	
150	2	00:53:00 - 00:55:00	
145	2	00:55:00 - 00:57:00	
140	4	00:57:00 - 01:01:00	
135	4	01:01:00 - 01:05:00	
130	4	01:05:00 - 01:09:00	
125	4	01:09:00 - 01:13:00	
120	4	01:13:00 - 01:17:00	
115	4	01:17:00 - 01:21:00	
110	4	01:21:00 - 01:25:00	
105	4	01:25:00 - 01:29:00	

Table A-8

FINAL SCHEDULE - 400-FOOT/30-MINUTE (Continued)

Depth (ft)	Time (min)	Elapsed Time (hr:min:sec)	Media
100	3	01:29:00 - 01:32:00	Air ↓
98	3	01:32:00 - 01:35:00	
96	3	01:35:00 - 01:38:00	
94	3	01:38:00 - 01:41:00	
92	3	01:41:00 - 01:44:00	
90	3	01:44:00 - 01:47:00	
88	3	01:47:00 - 01:50:00	
86	3	01:50:00 - 01:53:00	
84	3	01:53:00 - 01:56:00	
82	3	01:56:00 - 01:59:00	
80	4	01:59:00 - 02:03:00	
78	4	02:03:00 - 02:07:00	
76	4	02:07:00 - 02:11:00	
74	4	02:11:00 - 02:15:00	
72	4	02:15:00 - 02:19:00	
70	4	02:19:00 - 02:23:00	
68	4	02:23:00 - 02:27:00	
66	4	02:27:00 - 02:31:00	
64	4	02:31:00 - 02:35:00	
62	4	02:35:00 - 02:39:00	
60	6	02:39:00 - 02:45:00	↓
58	6	02:45:00 - 02:51:00	
56	6	02:51:00 - 02:57:00	
54	6	02:57:00 - 03:03:00	
52	6	03:03:00 - 03:09:00	
50	8	03:09:00 - 03:17:00	
48	8	03:17:00 - 03:25:00	
46	8	03:25:00 - 03:33:00	
44	8	03:33:00 - 03:41:00	
42	8	03:41:00 - 03:49:00	

Table A-8

FINAL SCHEDULE - 400-FOOT/30-MINUTE (Continued)

Depth (ft)	Time (min)	Elapsed Time (hr:min:sec)	Media
40	16	03:49:00 - 04:05:00	Air
38	16	04:05:00 - 04:21:00	↓
36	16	04:21:00 - 04:37:00	
34	16	04:37:00 - 04:53:00	
32	16	04:53:00 - 05:09:00	
30	20	05:09:00 - 05:29:00	
28	20	05:29:00 - 05:49:00	↓
26	20	05:49:00 - 06:09:00	
24	20	06:09:00 - 06:29:00	
22	20	06:29:00 - 06:49:00	
20	25	06:49:00 - 07:14:00	O ₂
18	25	07:14:00 - 07:39:00	Air
16	25	07:39:00 - 08:04:00	O ₂
14	25	08:04:00 - 08:29:00	Air
12	25	08:29:00 - 08:54:00	O ₂
10	30	08:54:00 - 09:24:00	Air
10	30	09:24:00 - 09:54:00	O ₂
10	30	09:54:00 - 10:24:00	Air
10	30	10:24:00 - 10:54:00	O ₂
10	30	10:54:00 - 11:24:00	Air
10	20	11:24:00 - 11:44:00	O ₂
10-0	10	11:44:00 - 11:54:00	O ₂

Times at the decompression stops include the time required for travel to next stop.

Bends-free Man-Dives: 8
Decompression Sickness: 0

Table A-9

FINAL SCHEDULE - 400-FOOT/60-MINUTE

Depth (ft.)	Time (min)	Elapsed Time (hr:min:sec)	Media
0-50	1	00:00:00 - 00:01:00	Air
50-100	1	00:01:00 - 00:02:00	↓
100-200	1	00:02:00 - 00:03:00	HeO ₂
200-300	1	00:03:00 - 00:04:00	90/10
300-400	1	00:04:00 - 00:05:00	↓
400	55	00:05:00 - 01:00:00	↓
400-350	1	01:00:00 - 01:01:00	↓
350-300	1	01:01:00 - 01:02:00	↓
300-250	1	01:02:00 - 01:03:00	↓
250	3	01:03:00 - 01:06:00	↓
240	3	01:06:00 - 01:09:00	↓
230	3	01:09:00 - 01:12:00	↓
220	3	01:12:00 - 01:15:00	↓
210	3	01:15:00 - 01:18:00	↓
200	7	01:18:00 - 01:25:00	HeO ₂
190	7	01:25:00 - 01:32:00	80/20
180	7	01:32:00 - 01:39:00	↓
170	7	01:39:00 - 01:46:00	↓
160	7	01:46:00 - 01:53:00	↓
150	2	01:53:00 - 01:55:00	↓
148	2	01:55:00 - 01:57:00	↓
146	2	01:57:00 - 01:59:00	↓
144	2	01:59:00 - 02:01:00	↓
142	2	02:01:00 - 02:03:00	↓
140	2	02:03:00 - 02:05:00	↓
138	2	02:05:00 - 02:07:00	↓
136	2	02:07:00 - 02:09:00	↓
134	2	02:09:00 - 02:11:00	↓
132	2	02:11:00 - 02:13:00	↓
130	2	02:13:00 - 02:15:00	↓
128	2	02:15:00 - 02:17:00	↓
126	2	02:17:00 - 02:19:00	↓
124	2	02:19:00 - 02:21:00	↓
122	2	02:21:00 - 02:23:00	↓

Table A-9

FINAL SCHEDULE - 400-FOOT/60-MINUTE (Continued)

Depth (ft)	Time (min)	Elapsed Time (hr:min:sec)	Media
120	4	02:23:00 - 02:27:00	Air
118	4	02:27:00 - 02:31:00	
116	4	02:31:00 - 02:35:00	
114	4	02:35:00 - 02:39:00	
112	4	02:39:00 - 02:43:00	
110	4	02:43:00 - 02:47:00	
108	4	02:47:00 - 02:51:00	
106	4	02:51:00 - 02:55:00	
104	4	02:55:00 - 02:59:00	
102	4	02:59:00 - 03:03:00	
100	4	03:03:00 - 03:07:00	
98	4	03:07:00 - 03:11:00	
96	4	03:11:00 - 03:15:00	
94	4	03:15:00 - 03:19:00	
92	4	03:19:00 - 03:23:00	
90	6	03:23:00 - 03:29:00	
88	6	03:29:00 - 03:35:00	
86	6	03:35:00 - 03:41:00	
84	6	03:41:00 - 03:47:00	
82	6	03:47:00 - 03:53:00	
80	6	03:53:00 - 03:59:00	
78	6	03:59:00 - 04:05:00	
76	6	04:05:00 - 04:11:00	
74	6	04:11:00 - 04:17:00	
72	6	04:17:00 - 04:23:00	
70	18	04:23:00 - 04:41:00	
68	18	04:41:00 - 04:59:00	
66	18	04:59:00 - 05:17:00	
64	18	05:17:00 - 05:35:00	
62	18	05:35:00 - 05:53:00	
60	18	05:53:00 - 06:11:00	
58	18	06:11:00 - 06:29:00	
56	18	06:29:00 - 06:47:00	
54	18	06:47:00 - 07:05:00	
52	18	07:05:00 - 07:23:00	

Table A-9

FINAL SCHEDULE - 400-FOOT/60-MINUTE (Continued)

Depth (ft)	Time (min)	Elapsed Time (hr:min:sec)	Media
50	26	07:23:00 - 07:49:00	Air
48	26	07:49:00 - 08:15:00	
46	26	08:15:00 - 08:41:00	
44	26	08:41:00 - 09:07:00	
42	26	09:07:00 - 09:33:00	
40	26	09:33:00 - 09:59:00	
38	26	09:59:00 - 10:25:00	
36	26	10:25:00 - 10:51:00	
34	26	10:51:00 - 11:17:00	
32	26	11:17:00 - 11:43:00	
30	28	11:43:00 - 12:11:00	↓ O ₂ Air O ₂ Air O ₂ ↓ Air O ₂ Air O ₂ Air O ₂ O ₂
28	28	12:11:00 - 12:39:00	
26	28	12:39:00 - 13:07:00	
24	28	13:07:00 - 13:35:00	
22	28	13:35:00 - 14:03:00	
20	30	14:03:00 - 14:33:00	
18	30	14:33:00 - 15:03:00	
16	30	15:03:00 - 15:33:00	
14	30	15:33:00 - 16:03:00	
12	30	16:03:00 - 16:33:00	
10	30	16:33:00 - 17:03:00	Air O ₂ Air O ₂ Air O ₂ O ₂
10	30	17:03:00 - 17:33:00	
10	30	17:33:00 - 18:03:00	
10	30	18:03:00 - 18:33:00	
10	30	18:33:00 - 19:03:00	
10	20	19:03:00 - 19:23:00	
10-0	10	19:23:00 - 19:33:00	

Times at the decompression stops include the time required for travel to next stop.

Bends-free Man-Dives: 8

Decompression Sickness: 1

Divers Accompanying Treatment: 2

Table A-10

FINAL SCHEDULE - 450 FOOT/15-MINUTE

Depth (ft)	Time (min)	Elapsed Time (hr:min:sec)	Media
0-100	1	00:00:00 - 00:01:00	Air
100-450	4	00:01:00 - 00:05:00	HeO ₂
450	10	00:05:00 - 00:15:00	90/10
450-270	3	00:15:00 - 00:18:00	
270-230	1	00:18:00 - 00:19:00	
230	1	00:19:00 - 00:20:00	
220	1	00:20:00 - 00:21:00	
210	2	00:21:00 - 00:23:00	
200	1	00:23:00 - 00:24:00	
190	2	00:24:00 - 00:26:00	
180	1	00:26:00 - 00:27:00	
170	2	00:27:00 - 00:29:00	
160	1	00:29:00 - 00:30:00	
150	5	00:30:00 - 00:35:00	
140	5	00:35:00 - 00:40:00	
130	5	00:40:00 - 00:45:00	
120	5	00:45:00 - 00:50:00	
110	5	00:50:00 - 00:55:00	
100	5	00:55:00 - 01:00:00	
96	10	01:00:00 - 01:10:00	
80	15	01:10:00 - 01:25:00	
70	15	01:25:00 - 01:40:00	
60	15	01:40:00 - 01:55:00	
50	30	01:55:00 - 02:25:00	
40	40	02:25:00 - 03:05:00	
30	30	03:05:00 - 03:35:00	
30	30	03:35:00 - 04:05:00	
30	30	04:05:00 - 04:35:00	
20	30	04:35:00 - 05:05:00	
20	30	05:05:00 - 05:35:00	
20	30	05:35:00 - 06:05:00	
20	30	06:05:00 - 06:35:00	

Table A-10

FINAL SCHEDULE - 450 FOOT/15-MINUTE (Continued)

Depth (ft)	Time (min)	Elapsed Time (hr:min:sec)	Media
10	30	06:35:00 - 07:05:00	Air
10	30	07:05:00 - 17:35:00	O ₂
10	30	07:35:00 - 08:05:00	Air
10	30	08:05:00 - 08:35:00	O ₂
10	85	08:35:00 - 10:00:00	Air
10-0	10	10:00:00 - 10:00:10	Air

Times at the decompression stops include the time required for travel to the next stop.

Bends-free Man-Dives: 2
Decompression Sickness: 0

Table A-11

FINAL SCHEDULE - 450-FOOT/30-MINUTE

Depth (ft)	Time (min)	Elapsed Time (hr:min:sec)	Media
0-75	1	00:00:00 - 00:01:00	Air ↓ HeO ₂ 92/08
75-150	1	00:01:00 - 00:02:00	
150-450	3	00:02:00 - 00:05:00	
450	25	00:05:00 - 00:30:00	
450-270	3	00:30:00 - 00:33:00	↓ HeO ₂ 80/20
270	1	00:33:00 - 00:34:00	
260	1	00:34:00 - 00:35:00	
250	2	00:35:00 - 00:37:00	
240	2	00:37:00 - 00:39:00	
230	2	00:39:00 - 00:41:00	
220	3	00:41:00 - 00:44:00	
216	2	00:44:00 - 00:46:00	
206	2	00:46:00 - 00:48:00	
202	2	00:48:00 - 00:50:00	
198	2	00:50:00 - 00:52:00	↓ HeO ₂ 80/20
194	2	00:52:00 - 00:54:00	
190	2	00:54:00 - 00:56:00	
186	2	00:56:00 - 00:58:00	
182	2	00:58:00 - 01:00:00	
178	2	01:00:00 - 01:02:00	
174	2	01:02:00 - 01:04:00	
170	2	01:04:00 - 01:06:00	
166	2	01:06:00 - 01:08:00	
162	2	01:08:00 - 01:10:00	
158	2	01:10:00 - 01:12:00	↓
154	2	01:12:00 - 01:14:00	
150	3	01:14:00 - 01:17:00	
146	3	01:17:00 - 01:20:00	
142	3	01:20:00 - 01:23:00	
138	3	01:23:00 - 01:26:00	
134	3	01:26:00 - 01:29:00	

Table A-11

FINAL SCHEDULE - 450-FOOT/30-MINUTE (Continued)

Depth (ft)	Time (min)	Elapsed Time (hr:min:sec)	Media
130	2	01:29:00 - 01:31:00	Air
128	2	01:31:00 - 01:33:00	
126	2	01:33:00 - 01:35:00	
124	2	01:35:00 - 01:37:00	
122	2	01:37:00 - 01:39:00	
120	2	01:39:00 - 01:41:00	
118	2	01:41:00 - 01:43:00	
116	2	01:43:00 - 01:45:00	
114	2	01:45:00 - 01:47:00	
112	2	01:47:00 - 01:49:00	
110	2	01:49:00 - 01:51:00	
108	2	01:51:00 - 01:53:00	
106	2	01:53:00 - 01:55:00	
104	2	01:55:00 - 01:57:00	
102	2	01:57:00 - 01:59:00	
100	2	01:59:00 - 02:01:00	
98	2	02:01:00 - 02:03:00	
96	2	02:03:00 - 02:05:00	
94	2	02:05:00 - 02:07:00	
92	2	02:07:00 - 02:09:00	
90	6	02:09:00 - 02:15:00	
88	6	02:15:00 - 02:21:00	
86	6	02:21:00 - 02:27:00	
84	6	02:27:00 - 02:33:00	
82	6	02:33:00 - 02:39:00	
80	6	02:39:00 - 02:45:00	
78	6	02:45:00 - 02:51:00	
76	6	02:51:00 - 02:57:00	
74	6	02:57:00 - 03:03:00	
72	6	03:03:00 - 03:09:00	

Table A-11

FINAL SCHEDULE - 450-FOOT/30-MINUTE (Continued)

Depth (ft)	Time (min)	Elapsed Time (hr:min:sec)	Media
70	6	03:09:00 - 03:15:00	Air ↓
68	6	03:15:00 - 03:21:00	
66	6	03:21:00 - 03:27:00	
64	6	03:27:00 - 03:33:00	
62	6	03:33:00 - 03:39:00	
60	6	03:39:00 - 03:45:00	
58	6	03:45:00 - 03:51:00	
56	6	03:51:00 - 03:57:00	
54	6	03:57:00 - 04:03:00	
52	6	04:03:00 - 04:09:00	
50	18	04:09:00 - 04:27:00	
48	18	04:27:00 - 04:45:00	
46	18	04:45:00 - 05:03:00	
44	18	05:03:00 - 05:21:00	
42	18	05:21:00 - 05:39:00	
40	18	05:39:00 - 05:57:00	
38	18	05:57:00 - 06:15:00	
36	18	06:15:00 - 06:33:00	
34	18	06:33:00 - 06:51:00	
32	18	06:51:00 - 07:09:00	
30	20	07:09:00 - 07:29:00	02
28	30	07:29:00 - 07:59:00	Air
26	20	07:59:00 - 08:19:00	02
24	30	08:19:00 - 08:49:00	Air
22	20	08:49:00 - 09:09:00	02
20	30	09:09:00 - 09:39:00	Air
18	20	09:39:00 - 09:59:00	02
16	30	09:59:00 - 10:29:00	Air
14	20	10:29:00 - 10:49:00	02
12	30	10:49:00 - 11:19:00	Air

Table A-11

FINAL SCHEDULE - 450-FOOT/30-MINUTE (Continued)

Depth (ft)	Time (min)	Elapsed Time (hr:min:sec)	Media
10	30	11:19:00 - 11:49:00	O ₂
10	40	11:49:00 - 12:29:00	Air
10	30	12:29:00 - 12:59:00	O ₂
10	40	12:59:00 - 13:39:00	Air
10	20	13:39:00 - 13:59:00	O ₂
10-0	10	13:59:00 - 14:09:00	O ₂

Times at the decompression stops include the time required for travel to next stop.

Bends-free Man-Dives: 9 (Including 2 man-dives with short bottom times)

Decompression Sickness: 1

Divers Accompanying Treatment: 0

Table A-12

FINAL SCHEDULE - 450-FOOT/60-MINUTE

Depth (ft)	Time (min)	Elapsed Time (hr:min:sec)	Media
0-75	1	00:00:00 - 00:01:00	Air HeO ₂ 92/08 ↓
75-150	1	00:01:00 - 00:02:00	
150-250	1	00:02:00 - 00:03:00	
250-350	1	00:03:00 - 00:04:00	
350-450	1	00:04:00 - 00:05:00	
450	55	00:05:00 - 01:00:00	
450-400	1	01:00:00 - 01:01:00	
400-350	1	01:01:00 - 01:02:00	
350-300	1	01:02:00 - 01:03:00	
300	1	01:03:00 - 01:04:00	
290	2	01:04:00 - 01:06:00	↓
280	2	01:06:00 - 01:08:00	
275	2	01:08:00 - 01:10:00	
270	2	01:10:00 - 01:12:00	
265	2	01:12:00 - 01:14:00	
260	2	01:14:00 - 01:16:00	
255	2	01:16:00 - 01:18:00	
250	2	01:18:00 - 01:20:00	
245	2	01:20:00 - 01:22:00	
240	2	01:22:00 - 01:24:00	
236	2	01:24:00 - 01:26:00	
232	2	01:26:00 - 01:28:00	
228	2	01:28:00 - 01:30:00	
224	2	01:30:00 - 01:32:00	
220	2	01:32:00 - 01:34:00	
218	2	01:34:00 - 01:36:00	
216	2	01:36:00 - 01:38:00	
214	2	01:38:00 - 01:40:00	
212	2	01:40:00 - 01:42:00	
210	2	01:42:00 - 01:44:00	
208	2	01:44:00 - 01:46:00	
206	2	01:46:00 - 01:48:00	
204	2	01:48:00 - 01:50:00	
202	2	01:50:00 - 01:52:00	

Table A-12

FINAL SCHEDULE - 450-FOOT/60-MINUTE (Continued)

Depth (ft)	Time (min)	Elapsed Time (hr:min:sec)	Media
200	2	01:52:00 - 01:54:00	HeO ₂ 80/20 ↓
198	2	01:54:00 - 01:56:00	
196	2	01:56:00 - 01:58:00	
194	2	01:58:00 - 02:00:00	
192	2	02:00:00 - 02:02:00	
190	2	02:02:00 - 02:04:00	
188	2	02:04:00 - 02:06:00	
186	2	02:06:00 - 02:08:00	
184	2	02:08:00 - 02:10:00	
182	2	02:10:00 - 02:12:00	
180	2	02:12:00 - 02:14:00	
178	2	02:14:00 - 02:16:00	
176	2	02:16:00 - 02:18:00	
174	2	02:18:00 - 02:20:00	
172	2	02:20:00 - 02:22:00	
170	2	02:22:00 - 02:24:00	
168	2	02:24:00 - 02:26:00	
166	2	02:26:00 - 02:28:00	
164	2	02:28:00 - 02:30:00	
162	2	02:30:00 - 02:32:00	
160	2	02:32:00 - 02:34:00	
158	2	02:34:00 - 02:36:00	
156	2	02:36:00 - 02:38:00	
154	2	02:38:00 - 02:40:00	
152	2	02:40:00 - 02:42:00	
150	2	02:42:00 - 02:44:00	
148	2	02:44:00 - 02:46:00	
146	2	02:46:00 - 02:48:00	
144	2	02:48:00 - 02:50:00	
142	2	02:50:00 - 02:52:00	
140	3	02:52:00 - 02:55:00	Air ↓
138	3	02:55:00 - 02:58:00	
136	3	02:58:00 - 03:01:00	
134	3	03:01:00 - 03:04:00	
132	3	03:04:00 - 03:07:00	
130	3	03:07:00 - 03:10:00	
128	3	03:10:00 - 03:13:00	
126	3	03:13:00 - 03:16:00	
124	3	03:16:00 - 03:19:00	
122	3	03:19:00 - 03:22:00	

Table A-12

FINAL SCHEDULE - 450-FOOT/60-MINUTE (Continued)

Depth (ft)	Time (min)	Elapsed Time (hr:min:sec)	Media
120	4	03:22:00 - 03:26:00	Air ↓
118	4	03:26:00 - 03:30:00	
116	4	03:30:00 - 03:34:00	
114	4	03:34:00 - 03:38:00	
112	4	03:38:00 - 03:42:00	
110	4	03:42:00 - 03:46:00	
108	4	03:46:00 - 03:50:00	
106	4	03:50:00 - 03:54:00	
104	4	03:54:00 - 03:58:00	
102	4	03:58:00 - 04:02:00	
100	12	04:02:00 - 04:14:00	
98	12	04:14:00 - 04:26:00	
96	12	04:26:00 - 04:38:00	
94	12	04:38:00 - 04:50:00	
92	12	04:50:00 - 05:02:00	
90	12	05:02:00 - 05:14:00	
88	12	05:14:00 - 05:26:00	
86	12	05:26:00 - 05:38:00	
84	12	05:38:00 - 05:50:00	
82	12	05:50:00 - 06:02:00	
80	16	06:02:00 - 06:18:00	↓
78	16	06:18:00 - 06:34:00	
76	16	06:34:00 - 06:50:00	
74	16	06:50:00 - 07:06:00	
72	16	07:06:00 - 07:22:00	
70	16	07:22:00 - 07:38:00	
68	16	07:38:00 - 07:54:00	
66	16	07:54:00 - 08:10:00	
64	16	08:10:00 - 08:26:00	↓
62	16	08:26:00 - 08:42:00	

Table A-12

FINAL SCHEDULE - 450-FOOT/60-MINUTE (Continued)

Depth (ft)	Time (min)	Elapsed Time (hr:min:sec)	Media
60	20	08:42:00 - 09:02:00	Air
58	20	09:02:00 - 09:22:00	
56	20	09:22:00 - 09:42:00	
54	20	09:42:00 - 10:02:00	
52	20	10:02:00 - 10:22:00	
50	20	10:22:00 - 10:42:00	
48	20	10:42:00 - 11:02:00	
46	20	11:02:00 - 11:22:00	
44	20	11:22:00 - 11:42:00	
42	20	11:42:00 - 12:02:00	
40	22	12:02:00 - 12:24:00	
38	22	12:24:00 - 12:46:00	
36	22	12:46:00 - 13:08:00	
34	22	13:08:00 - 13:30:00	
32	22	13:30:00 - 13:52:00	
30	30	13:52:00 - 14:22:00	↓
28	20	14:22:00 - 14:42:00	O ₂
26	30	14:42:00 - 15:12:00	Air
24	20	15:12:00 - 15:32:00	O ₂
22	30	15:32:00 - 16:02:00	Air
20	30	16:02:00 - 16:32:00	O ₂
18	30	16:32:00 - 17:02:00	Air
16	30	17:02:00 - 17:32:00	O ₂
14	30	17:32:00 - 18:02:00	Air
12	30	18:02:00 - 18:32:00	O ₂
10	30	18:32:00 - 19:02:00	Air
10	30	19:02:00 - 19:32:00	O ₂
10	30	19:32:00 - 20:02:00	Air
10	30	20:02:00 - 20:32:00	O ₂
10	30	20:32:00 - 21:02:00	Air
10	20	21:02:00 - 21:22:00	O ₂
10-0	10	21:22:00 - 21:32:00	O ₂

Table A-12

FINAL SCHEDULE - 450-FOOT/60-MINUTE (Continued)

Times at the decompression stops include the time required for travel to next stop.

Bends-free Man-Dives: 9
Decompression Sickness: 1 (Possible)
Divers Accompanying Treatment: 0

Table A-13

FINAL SCHEDULE - 500-FOOT/30-MINUTE

Depth (ft)	Time (min)	Elapsed Time (hr:min:sec)	Media
0-100	1.33	00:00:00 - 00:01:20	Air
100-500	5.33	00:01:20 - 00:06:40	He02
500	23.33	00:06:40 - 00:30:00	92/8
500-290	4	00:30:00 - 00:34:00	
290	2	00:34:00 - 00:36:00	
280	2	00:36:00 - 00:38:00	
270	2	00:38:00 - 00:40:00	
260	2	00:40:00 - 00:42:00	
250	2	00:42:00 - 00:44:00	
245	2	00:44:00 - 00:46:00	
240	2	00:46:00 - 00:48:00	
235	2	00:48:00 - 00:50:00	
230	2	00:50:00 - 00:52:00	
225	2	00:52:00 - 00:54:00	
220	2	00:54:00 - 00:56:00	
215	2	00:56:00 - 00:58:00	
210	2	00:58:00 - 01:00:00	
205	2	01:00:00 - 01:02:00	He02
200	2	01:02:00 - 01:04:00	80/20
195	2	01:04:00 - 01:06:00	
190	2	01:06:00 - 01:08:00	
186	2	01:08:00 - 01:10:00	
182	2	01:10:00 - 01:12:00	
178	2	01:12:00 - 01:14:00	
174	2	01:14:00 - 01:16:00	

Table A-13

FINAL SCHEDULE - 500-FOOT/30-MINUTE (Continued)

Depth (ft)	Time (min)	Elapsed Time (hr:min:sec)	Media
170	2	01:16:00 - 01:18:00	HeO ₂ 80/20
168	2	01:18:00 - 01:20:00	
166	2	01:20:00 - 01:22:00	
164	2	01:22:00 - 01:24:00	
162	2	01:24:00 - 01:26:00	
160	2	01:26:00 - 01:28:00	
158	2	01:28:00 - 01:30:00	
156	2	01:30:00 - 01:32:00	
154	2	01:32:00 - 01:34:00	
152	2	01:34:00 - 01:36:00	
150	2	01:36:00 - 01:38:00	
148	2	01:38:00 - 01:40:00	
146	2	01:40:00 - 01:42:00	
144	2	01:42:00 - 01:44:00	Air
142	2	01:44:00 - 01:46:00	
140	2	01:46:00 - 01:48:00	
138	2	01:48:00 - 01:50:00	
136	2	01:50:00 - 01:52:00	
134	2	01:52:00 - 01:54:00	
132	2	01:54:00 - 01:56:00	
130	2	01:56:00 - 01:58:00	
128	2	01:58:00 - 02:00:00	
126	2	02:00:00 - 02:02:00	
124	2	02:02:00 - 02:04:00	
122	2	02:04:00 - 02:06:00	
120	2	02:06:00 - 02:08:00	
118	2	02:08:00 - 02:10:00	
116	2	02:10:00 - 02:12:00	
114	2	02:12:00 - 02:14:00	
112	2	02:14:00 - 02:16:00	
110	4	02:16:00 - 02:20:00	RR 15-70
108	4	02:20:00 - 02:24:00	
106	4	02:24:00 - 02:28:00	
104	4	02:28:00 - 02:32:00	
102	4	02:32:00 - 02:36:00	
100	4	02:36:00 - 02:40:00	
98	4	02:40:00 - 02:44:00	
96	4	02:44:00 - 02:48:00	

Table A-13

FINAL SCHEDULE - 500-FOOT/30-MINUTE (Continued)

Depth (ft)	Time (min)	Elapsed Time (hr:min:sec)	Media
94	4	02:48:00 - 02:52:00	Air
92	4	02:52:00 - 02:56:00	
90	5	02:56:00 - 03:01:00	↓
88	5	03:01:00 - 03:06:00	
86	5	03:06:00 - 03:11:00	
84	5	03:11:00 - 03:16:00	
82	5	03:16:00 - 03:21:00	
80	5	03:21:00 - 03:26:00	
78	5	03:26:00 - 03:31:00	
76	5	03:31:00 - 03:36:00	
74	5	03:36:00 - 03:41:00	
72	5	03:41:00 - 03:46:00	
70	13	03:46:00 - 03:59:00	
68	13	03:59:00 - 04:12:00	
66	13	04:12:00 - 04:25:00	
64	13	04:25:00 - 04:38:00	
62	13	04:38:00 - 04:51:00	
60	13	04:51:00 - 05:04:00	
58	13	05:04:00 - 05:17:00	
56	13	05:17:00 - 05:30:00	
54	13	05:30:00 - 05:43:00	
52	13	05:43:00 - 05:56:00	
50	18	05:56:00 - 06:14:00	↓
48	18	06:14:00 - 06:32:00	
46	18	06:32:00 - 06:50:00	
44	18	06:50:00 - 07:08:00	
42	18	07:08:00 - 07:26:00	
40	18	07:26:00 - 07:44:00	
38	18	07:44:00 - 08:02:00	
36	18	08:02:00 - 08:20:00	
34	18	08:20:00 - 08:38:00	
32	18	08:38:00 - 08:56:00	

Table A-13

FINAL SCHEDULE - 500-FOOT/30-MINUTE (Continued)

Depth (ft)	Time (min)	Elapsed Time (hr:min:sec)	Media
30	30	08:56:00 - 09:26:00	Air
28	20	09:26:00 - 09:46:00	O ₂
26	30	09:46:00 - 10:16:00	Air
24	20	10:16:00 - 10:36:00	O ₂
22	30	10:36:00 - 11:06:00	Air
20	30	11:06:00 - 11:36:00	O ₂
18	30	11:36:00 - 12:06:00	Air
16	30	12:06:00 - 12:36:00	O ₂
14	30	12:36:00 - 13:06:00	Air
12	30	13:06:00 - 13:36:00	O ₂
10	30	13:36:00 - 14:06:00	Air
10	30	14:06:00 - 14:36:00	O ₂
10	30	14:36:00 - 15:06:00	Air
10	30	15:06:00 - 15:36:00	O ₂
10	30	15:36:00 - 16:06:00	Air
10	20	16:06:00 - 16:26:00	O ₂
10-0	10	16:26:00 - 16:36:00	O ₂

Times at the decompression stops include the time required for travel to next stop.

Bends-free Man-Dives: 2
Decompression Sickness: 0

Appendix B

DIVER DATA

Table B-1 Diver Data . . . 105

Table B-1

DIVER DATA

Name	Rate	NEC	Birth Date	Ht. (in.)	Wt. (lbs.)	Service No.
Anderson, J.W.	EMC	5341	Birth Year '25	67.0	170	871-18-77
Beckham, C.	BMC	5341				
Bigger, F.N.	BMCS	5341	Birth Year '30	73.5	222	719-82-89
Blackburn, R.M.	A01	5342	Birth Year '39	74.0	201	521-42-44
Brady, J.A.	SFC	5342				288-99-60
Brauner, F.H.	SFC	5341	Birth Year '35	72.5	180	921-60-08
Brown, J.A.	SFC	5342	Birth Year '36	71.0	165	288-99-60
Bruneau, R.W.	TM1	5342	6 Aug 36	73.0	216	901-70-99
Buckner, M.L.	SWC	5342				
Casse, R.G.	BM1	5342	Birth Year '39	72.0	198	514-13-35
Cato, M. P.	BMC	5342	30 Aug 39	71.5	172	515-50-57
Coffman, W.R.	TM1	5342	Birth Year '33	73.0	200	061-08-36
Donaldson, G.B.	HM1	8493	Birth Year '34	72.0	185	253-37-35
Duff, C.W.	HMC	8493	Birth Year '30	58.0	215	364-61-99
Douthit, B.	PH2	5342	16 Jan 35	69.5	170	749-35-57
French, W.T.	ETC	5342	Birth Year '27	71.5	170	264-48-90
Garrahan, R.N.	W-1	5342	Birth Year '36	70.0	145	492-00-08
Green	LT					
Harter, J.	LCDR					
Hendry, H.E.	HM1	8493	29 Jul 34	66.0	170	422-98-22
Houle, H.R.	BM2	5342	Birth Year '44	71.0	171	903-68-21
Jones, H.G.	HMC	8493	Birth Year '32	75.0	235	327-15-47
Kerr, J.H.	BM1		Birth Year '33	N.R.	N.R.	281-42-06
Kemedy, C.B.	ST1	5342	20 Oct 31	71.0	165	752-93-28
Langdon	DCC	5342				
Lazaro, J.C.	EN2	5342	Birth Year '28	69.0	146	256-79-06
Mandible, A.G.	GMG1	5342	20 Feb 35	69.5	170	462-35-60
May, M.J.	BM1	5343	12 Oct 42	66.0	164	586-77-68
Meeks, D.W.	BM1	5342	23 Jun 41	68.75	137	532-15-29
Mesplay, W.L.	SFC	5342	21 Dec 36	68.0	162	467-69-35
Mullen, J.E.	BMC	5342	12 Aug 39	64.0	160	494-95-62
Mulally, R.L.	DCC	5341	9 Jan 34	73.0	179	445-43-31
Mundy, J.G.	PH1	5342	Birth Year '41	67.0	162	525-13-54
Parkinson, T.	PHC		Birth Year '30	76.0	200	558-24-74
Pratt, J.L.	DC2	5342	26 May 42	78.0	229	585-19-83
Reedy, T.W.	HMC	5342	12 Sep 41	68.0	155	536-30-85
Rudin, I.C.	BM1	5342	29 Dec 32	73.0	155	231-65-19
Taylor, J.	BMC	5342				351-70-57
Stubbs, J.P.	SFM2	5342	Birth Year '41	70.5	216	965-52-77
Sundstrom, E.	MMCS	5342	30 Nov 31	70.0	180	388-59-07
Villasenor	GMC	5341				
Wallace, K.	BMC	5341				761-75-84

Table B-1 (Continued)

DIVER DATA

Name	Rate	NEC	Birth Date	Ht. (in.)	Wt. (lbs)	Service No.
Wells, R.V.	MNCS	5342	Birth Year '30	68.5	164	349-78-85
Winters, W.	ENC	5342	16 Nov 40	71.5	168	514-13-26
Wyatt, F.M. Jr.	BMC	5342	23 Aug 28	78.0	180	787-73-57

Description of NEC Codes:

- 5341 - Master Diver
- 5342 - First Class Diver
- 5343 - Second Class Diver
- 8493 - Diving Medical Technician
- 8196 - Photographer

Appendix C

SUMMARY OF DECOMPRESSION SICKNESS

Table C-1	Decompression Sickness by Dive Group . . .	109
Table C-2	Decompression Sickness by Diver	111

Table C-1
DECOMPRESSION SICKNESS BY DIVE GROUP

Dive Group	Dive No.	Diver	Depth of Occurrence	Symptoms	NAVY DIVING Accident Report No.	Treatment*
300-ft/15-min	No decompression sickness reported for this group					
300-ft/30-min	3	Mullen	50 ft. on ascent	Pain in right knee	3643	Recompressed to 100 feet
	5	Jones	After surfacing	Numbness in arms. Pain in right forearm, groin and legs	3644	Recompression (Table 6)
300-ft/60-min	No decompression sickness reported for this group					
350-ft/15-min	No decompression sickness reported for this group					
350-ft/30-min	No decompression sickness reported for this group					
350-ft/60-min	1	Garrahan	15 ft. on ascent	Inkle, left knee	Not reported	Recompressed to 30 feet
	2	Brauner	32 ft. on ascent	Twinge, left knee	3503	Recompressed to 50 feet
	3	Mullen	70 ft. on ascent	Rash on back and stomach	Not reported	O ₂ for 20 min at 60 feet and 58 feet

* Treatment Tables referred to in this Column are found in U.S. Navy Diving Manual, NAVSHIPS 0994-001-9010, March, 1970.

Table C-1

DECOMPRESSION SICKNESS BY DIVE GROUP (Continued)

Dive Group	Dive No.	Diver	Depth of Occurrence	Symptoms	NAV/DIVINGU Accident Report No.	Treatment
400-ft/15-min	2	Rudin Meeks	After surfacing	Rudin-Pain in rt knee Meeks-Pain in both knees, sore right thigh	3636 3637	Recompression (Table 5)
	4	Pratt	After surfacing	Pain in right leg	3642	Recompression (Table 5)
400-ft/30-min	No decompression sickness reported for this group					
400-ft/60-min	3	Garrahan	After surfacing	Slight ache in rt knee	3477	Recompressed to 33 feet
	4	Lazaro	After surfacing	Pain in calf of left leg	3478	Recompression (Table 5)
	6	Donaldson	44 ft on ascent	Pain in left knee & groin	3472	Recompressed to 60 feet
450-ft/15-min	No decompression sickness reported for this group					
450-ft/30-min	5	Donaldson	14 ft on ascent	Pain in rt knee	3468	Recompression (Table 5)
450-ft/60-min	3	Casse	98 ft on ascent	Dizziness and nausea	3491	No treatment
500-ft/30-min	No decompression sickness reported for this group					

Table C-2

SUMMARY OF DECOMPRESSION SICKNESS BY DIVER

Diver	Dive Group	Dive No.	Depth of Occurrence	Date
Brauner	350-ft/60-min	2	32 feet (Ascent)	14 Apr 66
Casse	450-ft/60-min	3	98 feet (Ascent)	13 Oct 66
Donaldson	400-ft/60-min	6	44 feet (Ascent)	6 Oct 66
	450-ft/30-min	5	14 feet (Ascent)	11 Oct 66
Garrahan	350-ft/60-min	1	15 feet (Ascent)	14 Oct 65
	400-ft/60-min	3	After surfacing	26 May 66
Jones	300-ft/30-min	5	After surfacing	10 Jul 67
Lazaro	400-ft/60-min	4	After surfacing	9 Jun 66
Meeks	400-ft/15-min	2	After surfacing	6 Jun 67
Mullen	300-ft/30-min	3	50 feet (Ascent)	6 Jul 67
	350-ft/60-min	3	70 feet (Ascent)	26 Apr 67
Pratt	400-ft/15-min	4	After surfacing	15 Jun 67
Rudin	400-ft/15-min	2	After surfacing	6 Jun 67